

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

## Genotyping Report

FMDV serotype: O  
Country: Vietnam  
Year: 2020  
Batch: WRLMEG/2021/00002  
No. of sequences: 4  
Report date: 19th February 2021  
Report generated by: Nick Knowles  
Report checked by: Jemma Wadsworth

This report is prepared on behalf of the Regional Animal Health Office No.6, Department of Animal Health, Ho Chi Minh City, Vietnam, and covers VP1 sequences submitted to the WRLFMD on 18th February 2021.



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www: <http://www.wrlfmd.org/>

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Virus sample name:	VIT/11272/2020a
Sender reference:	11272
Location of origin:	Tien Giang
Country of origin:	Vietnam
Date of collection:	27/10/2020
Host species:	pig
Serotype:	O
Topotype:	ME-SA
Lineage:	Ind-2001
Sublineage:	e
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	O-1C244F/EUR-2B52R
Received for sequencing:	n/a
Created:	18/02/2021
Last updated:	18/02/2021
VIBASys IDs: sample 47387, genome 47388, sequence viba_47389, sequencing info 47390	

### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_47401	VIT/11359/2020b	cattle	100.0	0	O	ME-SA	Ind-2001	e
viba_47291	LAO/3/2020	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_45022	VIT/7/2020	porcine	99.2	0	O	ME-SA	Ind-2001	e
viba_47316	TAI/4/2020	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_44987	VIT/28/2019	water buffalo	99.2	0	O	ME-SA	Ind-2001	e
viba_47287	LAO/2/2020	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_47295	LAO/4/2020	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_44967	VIT/17/2019	porcine	99.2	0	O	ME-SA	Ind-2001	e
viba_44983	VIT/27/2019	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_44979	VIT/25/2019	porcine	99.2	0	O	ME-SA	Ind-2001	e

### Most Closely Related Prototype Sequences

see <http://www.wrlfmd.org/fmdv-genome/fmd-prototype-strains>

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_30238	MUR/19/2016	cattle	95.4	0	O	ME-SA	Ind-2001	e
viba_293	BHU/3/2009	cattle	93.5	0	O	ME-SA	Ind-2001	d
viba_541	OMN/7/2001	bovine	90.7	0	O	ME-SA	Ind-2001	b
viba_705	KUW/3/97	bovine	90.4	0	O	ME-SA	Ind-2001	a
viba_397	UAE/4/2008	gazelle	89.3	0	O	ME-SA	Ind-2001	c
viba_766	IRN/31/2009	cattle	88.3	0	O	ME-SA	PanAsia-2	FAR-09
viba_650	IRN/8/2005	ovine	87.7	0	O	ME-SA	PanAsia-2	
viba_285	UKG/35/2001	porcine	87.6	0	O	ME-SA	PanAsia	
viba_359	Manisa/TUR/69		87.5	0	O	ME-SA		
viba_719	IRN/88/2009		87.1	0	O	ME-SA	PanAsia-2	ANT-10

Virus sample name:	VIT/11272/2020b
Sender reference:	11272
Location of origin:	Tien Giang
Country of origin:	Vietnam
Date of collection:	27/10/2020
Host species:	pig
Serotype:	O
Topotype:	ME-SA
Lineage:	Ind-2001
Sublineage:	e
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	O-1C272F/EUR-2B52R2
Received for sequencing:	n/a
Created:	18/02/2021
Last updated:	18/02/2021
VIBASys IDs: sample 47391, genome 47392, sequence viba_47393, sequencing info 47394	

### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_47397	VIT/11359/2020a	cattle	100.0	0	O	ME-SA	Ind-2001	e
viba_47291	LAO/3/2020	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_45022	VIT/7/2020	porcine	99.1	0	O	ME-SA	Ind-2001	e
viba_47316	TAI/4/2020	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_44987	VIT/28/2019	water buffalo	99.1	0	O	ME-SA	Ind-2001	e
viba_47287	LAO/2/2020	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_47295	LAO/4/2020	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_44967	VIT/17/2019	porcine	99.1	0	O	ME-SA	Ind-2001	e
viba_44983	VIT/27/2019	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_44979	VIT/25/2019	porcine	99.1	0	O	ME-SA	Ind-2001	e

### Most Closely Related Prototype Sequences

see <http://www.wrlfmd.org/fmdv-genome/fmd-prototype-strains>

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_30238	MUR/19/2016	cattle	95.4	0	O	ME-SA	Ind-2001	e
viba_293	BHU/3/2009	cattle	93.4	0	O	ME-SA	Ind-2001	d
viba_541	OMN/7/2001	bovine	90.9	0	O	ME-SA	Ind-2001	b
viba_705	KUW/3/97	bovine	90.2	0	O	ME-SA	Ind-2001	a
viba_397	UAE/4/2008	gazelle	89.6	0	O	ME-SA	Ind-2001	c
viba_766	IRN/31/2009	cattle	88.6	0	O	ME-SA	PanAsia-2	FAR-09
viba_719	IRN/88/2009		88.3	0	O	ME-SA	PanAsia-2	ANT-10
viba_285	UKG/35/2001	porcine	88.3	0	O	ME-SA	PanAsia	
viba_650	IRN/8/2005	ovine	88.2	0	O	ME-SA	PanAsia-2	
viba_359	Manisa/TUR/69		87.8	0	O	ME-SA		

Virus sample name:	VIT/11359/2020a
Sender reference:	11359
Location of origin:	Ben Tre
Country of origin:	Vietnam
Date of collection:	30/10/2020
Host species:	cattle
Serotype:	O
Topotype:	ME-SA
Lineage:	Ind-2001
Sublineage:	e
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	O-1C244F/EUR-2B52R
Received for sequencing:	n/a
Created:	18/02/2021
Last updated:	18/02/2021
VIBASys IDs: sample 47395, genome 47396, sequence viba_47397, sequencing info 47398	

### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_47393	VIT/11272/2020b		100.0	0	O	ME-SA	Ind-2001	e
viba_47291	LAO/3/2020	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_45022	VIT/7/2020	porcine	99.1	0	O	ME-SA	Ind-2001	e
viba_47316	TAI/4/2020	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_44987	VIT/28/2019	water buffalo	99.1	0	O	ME-SA	Ind-2001	e
viba_47287	LAO/2/2020	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_47295	LAO/4/2020	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_44967	VIT/17/2019	porcine	99.1	0	O	ME-SA	Ind-2001	e
viba_44983	VIT/27/2019	cattle	99.1	0	O	ME-SA	Ind-2001	e
viba_44979	VIT/25/2019	porcine	99.1	0	O	ME-SA	Ind-2001	e

### Most Closely Related Prototype Sequences

see <http://www.wrlfmd.org/fmdv-genome/fmd-prototype-strains>

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_30238	MUR/19/2016	cattle	95.4	0	O	ME-SA	Ind-2001	e
viba_293	BHU/3/2009	cattle	93.4	0	O	ME-SA	Ind-2001	d
viba_541	OMN/7/2001	bovine	90.9	0	O	ME-SA	Ind-2001	b
viba_705	KUW/3/97	bovine	90.2	0	O	ME-SA	Ind-2001	a
viba_397	UAE/4/2008	gazelle	89.6	0	O	ME-SA	Ind-2001	c
viba_766	IRN/31/2009	cattle	88.6	0	O	ME-SA	PanAsia-2	FAR-09
viba_719	IRN/88/2009		88.3	0	O	ME-SA	PanAsia-2	ANT-10
viba_285	UKG/35/2001	porcine	88.3	0	O	ME-SA	PanAsia	
viba_650	IRN/8/2005	ovine	88.2	0	O	ME-SA	PanAsia-2	
viba_359	Manisa/TUR/69		87.8	0	O	ME-SA		

Virus sample name:	VIT/11359/2020b
Sender reference:	11359
Location of origin:	Ben Tre
Country of origin:	Vietnam
Date of collection:	30/10/2020
Host species:	cattle
Serotype:	O
Topotype:	ME-SA
Lineage:	Ind-2001
Sublineage:	e
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	O-1C272F/EUR-2B52R2
Received for sequencing:	n/a
Created:	18/02/2021
Last updated:	18/02/2021
VIBASys IDs: sample 47399, genome 47400, sequence viba_47401, sequencing info 47402	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_47389	VIT/11272/2020a		100.0	0	O	ME-SA	Ind-2001	e
viba_47291	LAO/3/2020	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_45022	VIT/7/2020	porcine	99.2	0	O	ME-SA	Ind-2001	e
viba_47316	TAI/4/2020	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_44987	VIT/28/2019	water buffalo	99.2	0	O	ME-SA	Ind-2001	e
viba_47287	LAO/2/2020	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_47295	LAO/4/2020	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_44967	VIT/17/2019	porcine	99.2	0	O	ME-SA	Ind-2001	e
viba_44983	VIT/27/2019	cattle	99.2	0	O	ME-SA	Ind-2001	e
viba_44979	VIT/25/2019	porcine	99.2	0	O	ME-SA	Ind-2001	e

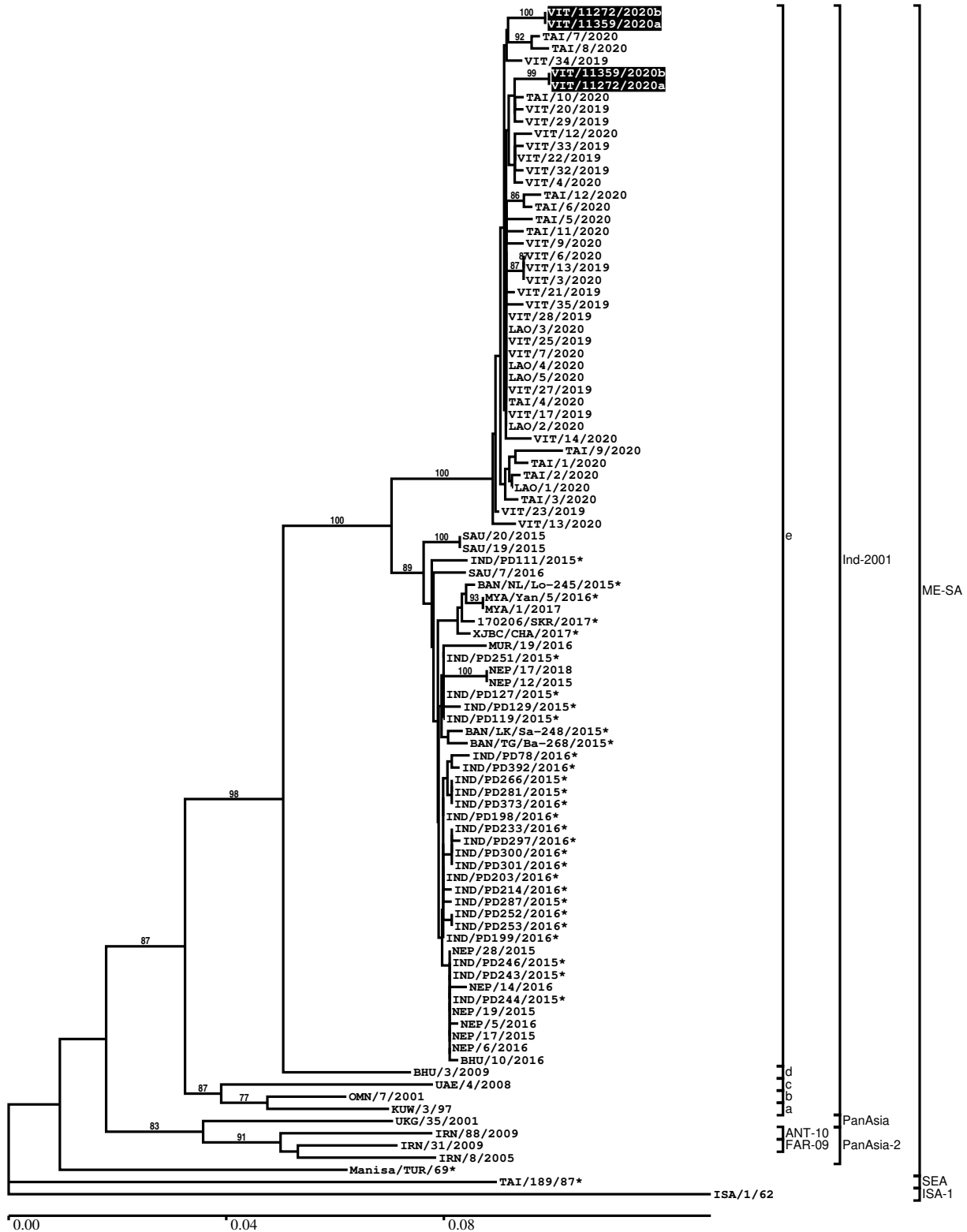
#### Most Closely Related Prototype Sequences

see <http://www.wrlfmd.org/fmdv-genome/fmd-prototype-strains>

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_30238	MUR/19/2016	cattle	95.4	0	O	ME-SA	Ind-2001	e
viba_293	BHU/3/2009	cattle	93.5	0	O	ME-SA	Ind-2001	d
viba_541	OMN/7/2001	bovine	90.7	0	O	ME-SA	Ind-2001	b
viba_705	KUW/3/97	bovine	90.4	0	O	ME-SA	Ind-2001	a
viba_397	UAE/4/2008	gazelle	89.3	0	O	ME-SA	Ind-2001	c
viba_766	IRN/31/2009	cattle	88.3	0	O	ME-SA	PanAsia-2	FAR-09
viba_650	IRN/8/2005	ovine	87.7	0	O	ME-SA	PanAsia-2	
viba_285	UKG/35/2001	porcine	87.6	0	O	ME-SA	PanAsia	
viba_359	Manisa/TUR/69		87.5	0	O	ME-SA		
viba_719	IRN/88/2009		87.1	0	O	ME-SA	PanAsia-2	ANT-10

Report on FMDV O in Vietnam in 2020

Batch: WRLMEG/2021/00002



\*, not a WRLFMD Reference Number

## Analysis Parameters

VP1 subsequence extractor:	vp1_O
Query sequence set:	WRLMEG/2021/00002-Vietnam-O (4 sequences)
Sequence database set:	allseqs_O (5148 sequences)
Prototype sequence set:	!prototypes_O (49 sequences)
Number of related sequences reported:	10
Minimal VP1 subsequence match length	600
Sequence alignment method:	muscle (default parameters)
Sequence alignment length:	636
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:	10
VIBASys version:	reflabs-1.1.2

## Sequences in the Phylogenetic Tree

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

label	accession	host(s)	lab	country	taxonomic information
VIT/11272/2020b	n/a	n/a	RAHO6	Vietnam	ME-SA/Ind-2001/e
VIT/11359/2020a	n/a	cattle	RAHO6	Vietnam	ME-SA/Ind-2001/e
TAI/7/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
TAI/8/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
VIT/34/2019	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/11359/2020b	n/a	cattle	RAHO6	Vietnam	ME-SA/Ind-2001/e
VIT/11272/2020a	n/a	n/a	RAHO6	Vietnam	ME-SA/Ind-2001/e
TAI/10/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
VIT/20/2019	n/a	water buffalo	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/29/2019	n/a	water buffalo	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/12/2020	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/33/2019	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/22/2019	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/32/2019	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/4/2020	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
TAI/12/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
TAI/6/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
TAI/5/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
TAI/11/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
VIT/9/2020	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/6/2020	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/13/2019	n/a	porcine	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/3/2020	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/21/2019	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/35/2019	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/28/2019	n/a	water buffalo	WRLFMD	Vietnam	ME-SA/Ind-2001/e
LAO/3/2020	n/a	cattle	WRLFMD	Laos	ME-SA/Ind-2001/e
VIT/25/2019	n/a	porcine	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/7/2020	n/a	porcine	WRLFMD	Vietnam	ME-SA/Ind-2001/e
LAO/4/2020	n/a	cattle	WRLFMD	Laos	ME-SA/Ind-2001/e
LAO/5/2020	n/a	cattle	WRLFMD	Laos	ME-SA/Ind-2001/e
VIT/27/2019	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
TAI/4/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
VIT/17/2019	n/a	porcine	WRLFMD	Vietnam	ME-SA/Ind-2001/e
LAO/2/2020	n/a	cattle	WRLFMD	Laos	ME-SA/Ind-2001/e
VIT/14/2020	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e

*continued on next page*

label	accession	host(s)	lab	country	taxonomic information
TAI/9/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
TAI/1/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
TAI/2/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
LAO/1/2020	n/a	cattle	WRLFMD	Laos	ME-SA/Ind-2001/e
TAI/3/2020	n/a	cattle	WRLFMD	Thailand	ME-SA/Ind-2001/e
VIT/23/2019	n/a	water buffalo	WRLFMD	Vietnam	ME-SA/Ind-2001/e
VIT/13/2020	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/e
SAU/20/2015	MG972591	bovine	WRLFMD	Saudi Arabia	ME-SA/Ind-2001/e
SAU/19/2015	MG972590	bovine	WRLFMD	Saudi Arabia	ME-SA/Ind-2001/e
IND/PD111/2015*	MT909623	n/a	PD-FMD	India	ME-SA/Ind-2001/e
SAU/7/2016	MG972596	bovine	WRLFMD	Saudi Arabia	ME-SA/Ind-2001/e
BAN/NL/Lo-245/2015*	KY077611	cattle	Univ Dhaka	Bangladesh	ME-SA/Ind-2001/e
MYA/Yan/5/2016*	LC438823	cattle	NIAH-Japan	Myanmar	ME-SA/Ind-2001/e
MYA/1/2017	MG972517	cattle	WRLFMD	Myanmar	ME-SA/Ind-2001/e
170206/SKR/2017*	n/a	cattle	QIA	Republic of Korea (South Korea)	ME-SA/Ind-2001/e
XJBC/CHA/2017*	KY696708	n/a	LVRI	China	ME-SA/Ind-2001/e
MUR/19/2016	MG972510	cattle	WRLFMD	Mauritius	ME-SA/Ind-2001/e
IND/PD251/2015*	MT909652	cattle	PD-FMD	India	ME-SA/Ind-2001/e
NEP/17/2018	n/a	goat	WRLFMD	Nepal	ME-SA/Ind-2001/e
NEP/12/2015	MG972545	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/e
IND/PD127/2015*	MT909627	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD129/2015*	MT909628	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD119/2015*	MT909624	cattle	PD-FMD	India	ME-SA/Ind-2001/e
BAN/LK/Sa-248/2015*	KY077612	cattle	Univ Dhaka	Bangladesh	ME-SA/Ind-2001/e
BAN/TG/Ba-268/2015*	KY077621	cattle	Univ Dhaka	Bangladesh	ME-SA/Ind-2001/e
IND/PD78/2016*	MT909668	water buffalo	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD392/2016*	MT909703	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD266/2015*	MT909655	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD281/2015*	MT909658	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD373/2016*	MT909702	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD198/2016*	MT909672	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD233/2016*	MT909676	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD297/2016*	MT909685	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD300/2016*	MT909687	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD301/2016*	MT909688	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD203/2016*	MT909674	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD214/2016*	MT909675	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD287/2015*	MT909659	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD252/2016*	MT909680	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD253/2016*	MT909681	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD199/2016*	MT909673	cattle	PD-FMD	India	ME-SA/Ind-2001/e
NEP/28/2015	KY449052	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/e
IND/PD246/2015*	MT909650	cattle	PD-FMD	India	ME-SA/Ind-2001/e
IND/PD243/2015*	MT909648	cattle	PD-FMD	India	ME-SA/Ind-2001/e
NEP/14/2016	MG972562	water buffalo	WRLFMD	Nepal	ME-SA/Ind-2001/e
IND/PD244/2015*	MT909649	cattle	PD-FMD	India	ME-SA/Ind-2001/e
NEP/19/2015	KY449051	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/e
NEP/5/2016	KY449053	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/e
NEP/17/2015	KY449050	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/e
NEP/6/2016	KY449054	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/e
BHU/10/2016	MG972484	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/e
BHU/3/2009	KM921814	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
UAE/4/2008	KM921876	gazelle	WRLFMD	United Arab Emirates	ME-SA/Ind-2001/c
OMN/7/2001	DQ164941	bovine	WRLFMD	Oman	ME-SA/Ind-2001/b
KUW/3/97	DQ164904	bovine	WRLFMD	Kuwait	ME-SA/Ind-2001/a
UKG/35/2001	AJ539141	porcine	PIADC	United Kingdom	ME-SA/PanAsia
IRN/88/2009	KY091282	n/a	WRLFMD	Iran	ME-SA/PanAsia-2/ANT-10
IRN/31/2009	KY091284	cattle	WRLFMD	Iran	ME-SA/PanAsia-2/FAR-09
IRN/8/2005	KY091281	ovine	WRLFMD	Iran	ME-SA/PanAsia-2
Manisa/TUR/69*	AY593823	n/a	PIADC	Turkey	ME-SA
TAI/189/87*	KY091288	bovine	TRRL	Thailand	SEA
ISA/1/62	AJ303500	n/a	WRLFMD	Indonesia	ISA-1



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