

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

## Genotyping Report

FMDV serotype: O  
Country: Nepal  
Year: 2017  
Batch: WRLFMD/2018/00005  
No. of sequences: 3  
Report date: 11th February 2018  
Report generated by: Nick Knowles  
Report checked by: Kasia Bankowska



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

email: [reporting@pirbright.ac.uk](mailto:reporting@pirbright.ac.uk)

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Virus sample name:	NEP/33/2017
Sender reference:	15 Np FMD
Location of origin:	KTC 26
Country of origin:	Nepal
Date of collection:	16/11/2017
Host species:	cattle
Serotype:	O
Topotype:	ME-SA
Lineage:	Ind-2001
Sublineage:	d
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	31/01/2018
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	07/02/2018
Created:	11/02/2018
Last updated:	11/02/2018
VIBASys IDs: sample 35803, genome 35804, sequence viba_35805, sequencing info 35806	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_35809	NEP/34/2017	cattle	100.0	0	O	ME-SA	Ind-2001	d
viba_31342	IND/166/2012	sheep	94.6	0	O	ME-SA	Ind-2001	d
viba_32853	IND/1/2011	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_12403	BHU/18/2009	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_14826	IND/220/2010	sheep	94.5	0	O	ME-SA	Ind-2001	d
viba_14710	IND/86/2010	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_31266	IND/32/2012	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_12367	BHU/2/2009	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_12371	BHU/4/2009	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_31250	IND/20/2012	cattle	94.5	0	O	ME-SA	Ind-2001	d

#### Most Closely Related Prototype Sequences

see [http://www.wrlfmd.org/fmd\\_genotyping/prototypes.htm](http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_293	BHU/3/2009	cattle	94.2	0	O	ME-SA	Ind-2001	d
viba_705	KUW/3/97	bovine	93.0	0	O	ME-SA	Ind-2001	a
viba_541	OMN/7/2001	bovine	93.0	0	O	ME-SA	Ind-2001	b
viba_397	UAE/4/2008	gazelle	92.6	0	O	ME-SA	Ind-2001	c
viba_285	UKG/35/2001	porcine	90.0	0	O	ME-SA	PanAsia	
viba_650	IRN/8/2005	ovine	88.9	0	O	ME-SA	PanAsia-2	
viba_617	IND/53/79	bovine	88.8	0	O	ME-SA		
viba_766	IRN/31/2009	cattle	88.6	0	O	ME-SA	PanAsia-2	FAR-09
viba_576	IND/R2/75		88.6	0	O	ME-SA		
viba_719	IRN/88/2009		88.3	0	O	ME-SA	PanAsia-2	ANT-10

Virus sample name:	NEP/34/2017
Sender reference:	16 Np FMD
Location of origin:	KTC 26
Country of origin:	Nepal
Date of collection:	16/11/2017
Host species:	cattle
Serotype:	O
Topotype:	ME-SA
Lineage:	Ind-2001
Sublineage:	d
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	31/01/2018
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	07/02/2018
Created:	11/02/2018
Last updated:	11/02/2018
VIBASys IDs: sample 35807, genome 35808, sequence viba_35809, sequencing info 35810	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_35805	NEP/33/2017	cattle	100.0	0	O	ME-SA	Ind-2001	d
viba_31342	IND/166/2012	sheep	94.6	0	O	ME-SA	Ind-2001	d
viba_32853	IND/1/2011	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_12403	BHU/18/2009	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_14826	IND/220/2010	sheep	94.5	0	O	ME-SA	Ind-2001	d
viba_14710	IND/86/2010	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_31266	IND/32/2012	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_12367	BHU/2/2009	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_12371	BHU/4/2009	cattle	94.5	0	O	ME-SA	Ind-2001	d
viba_31250	IND/20/2012	cattle	94.5	0	O	ME-SA	Ind-2001	d

#### Most Closely Related Prototype Sequences

see [http://www.wrlfmd.org/fmd\\_genotyping/prototypes.htm](http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_293	BHU/3/2009	cattle	94.2	0	O	ME-SA	Ind-2001	d
viba_705	KUW/3/97	bovine	93.0	0	O	ME-SA	Ind-2001	a
viba_541	OMN/7/2001	bovine	93.0	0	O	ME-SA	Ind-2001	b
viba_397	UAE/4/2008	gazelle	92.6	0	O	ME-SA	Ind-2001	c
viba_285	UKG/35/2001	porcine	90.0	0	O	ME-SA	PanAsia	
viba_650	IRN/8/2005	ovine	88.9	0	O	ME-SA	PanAsia-2	
viba_617	IND/53/79	bovine	88.8	0	O	ME-SA		
viba_766	IRN/31/2009	cattle	88.6	0	O	ME-SA	PanAsia-2	FAR-09
viba_576	IND/R2/75		88.6	0	O	ME-SA		
viba_719	IRN/88/2009		88.3	0	O	ME-SA	PanAsia-2	ANT-10

Virus sample name:	NEP/35/2017
Sender reference:	9 Np FMD
Location of origin:	Bhaktapur, Bagmati Zone
Country of origin:	Nepal
Date of collection:	12/12/2017
Host species:	cattle
Serotype:	O
Topotype:	ME-SA
Lineage:	Ind-2001
Sublineage:	d
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	01/02/2018
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	07/02/2018
Created:	11/02/2018
Last updated:	11/02/2018
VIBASys IDs: sample 35811, genome 35812, sequence viba_35813, sequencing info 35814	

### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_29931	NEP/7/2016	cattle	97.2	0	O	ME-SA	Ind-2001	d
viba_31131	BAN/SI/Sh-234/2015	cattle	97.0	0	O	ME-SA	Ind-2001	d
viba_23820	SAU/7/2016	bovine	97.0	0	O	ME-SA	Ind-2001	d
viba_26117	NEP/17/2015	cattle	97.0	0	O	ME-SA	Ind-2001	d
viba_29907	NEP/28/2015	cattle	97.0	0	O	ME-SA	Ind-2001	d
viba_31557	BHU/10/2016	cattle	97.0	0	O	ME-SA	Ind-2001	d
viba_26125	NEP/19/2015	cattle	97.0	0	O	ME-SA	Ind-2001	d
viba_29963	NEP/17/2016	cattle	97.0	0	O	ME-SA	Ind-2001	d
viba_29927	NEP/6/2016	cattle	97.0	0	O	ME-SA	Ind-2001	d
viba_31082	BAN/GKa-236(pig)/2015	porcine	97.0	0	O	ME-SA	Ind-2001	d

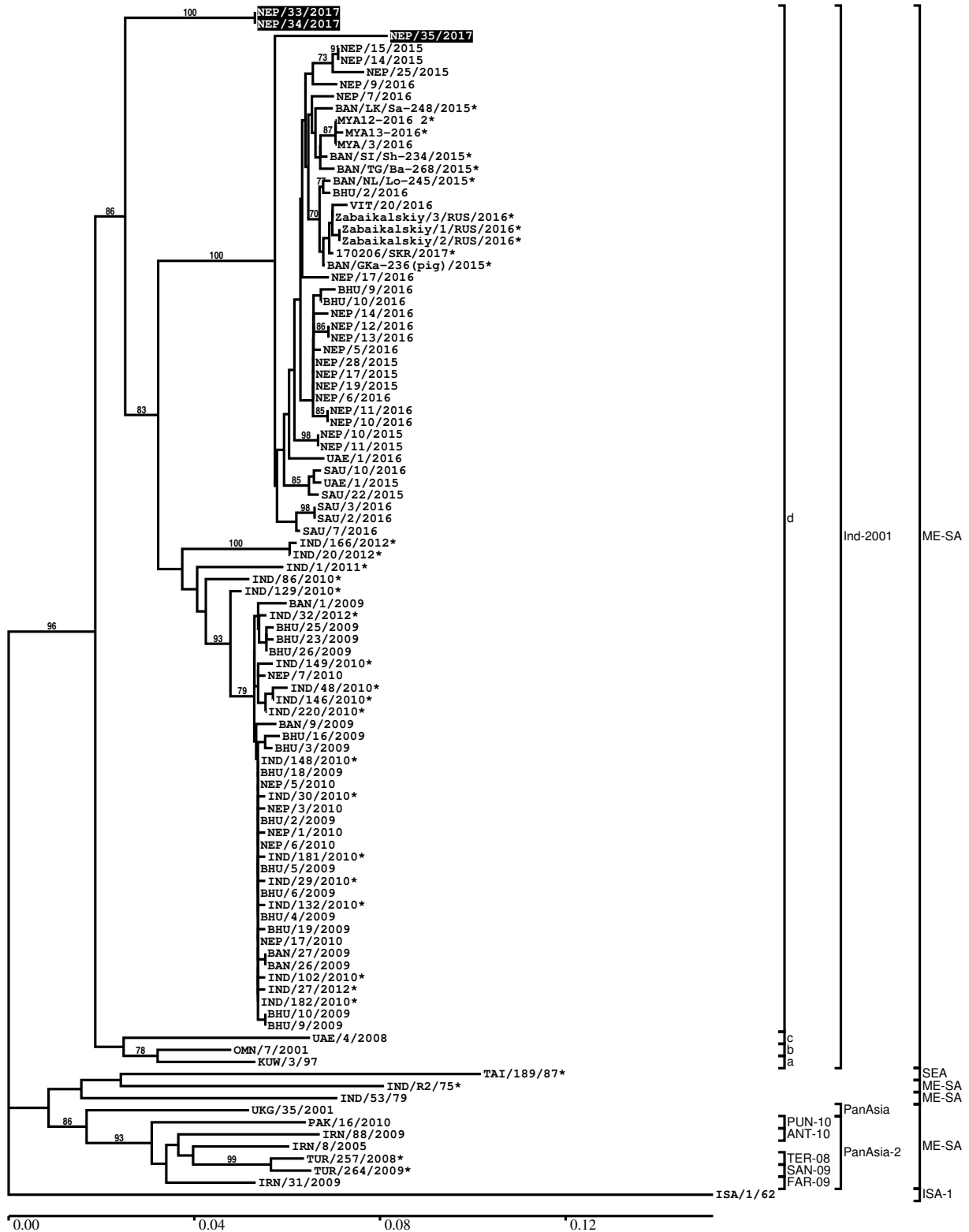
### Most Closely Related Prototype Sequences

see [http://www.wrlfmd.org/fmd\\_genotyping/prototypes.htm](http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_293	BHU/3/2009	cattle	93.2	0	O	ME-SA	Ind-2001	d
viba_541	OMN/7/2001	bovine	91.5	0	O	ME-SA	Ind-2001	b
viba_705	KUW/3/97	bovine	90.9	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	89.1	0	O	ME-SA	PanAsia-2	FAR-09
viba_285	UKG/35/2001	porcine	88.5	0	O	ME-SA	PanAsia	
viba_650	IRN/8/2005	ovine	88.2	0	O	ME-SA	PanAsia-2	
viba_354	PAK/16/2010	cattle	88.1	0	O	ME-SA	PanAsia-2	PUN-10
viba_491	TUR/257/2008		88.0	0	O	ME-SA	PanAsia-2	TER-08
viba_505	TUR/264/2009		88.0	0	O	ME-SA	PanAsia-2	SAN-09

Report on FMDV O in Nepal in 2017

Batch: WRLFMD/2018/00005



\*, not a WRLFMD Reference Number

## Analysis Parameters

VP1 subsequence extractor: vp1\_O  
 Query sequence set: WRLFMD/2018/00005-Nepal-O (3 sequences)  
 Sequence database set: allseqs\_O (3715 sequences)  
 Prototype sequence set: !prototypes\_O (48 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: 13  
 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
NEP/33/2017	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/34/2017	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/35/2017	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/15/2015	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/14/2015	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/25/2015	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/9/2016	n/a	porcine	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/7/2016	KY449055	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
BAN/LK/Sa-248/2015*	KY077612	cattle	Univ Dhaka	Bangladesh	ME-SA/Ind-2001/d
MYA12-2016 2*	n/a	n/a	TRRL	Myanmar	ME-SA/Ind-2001/d
MYA13-2016*	n/a	n/a	TRRL	Myanmar	ME-SA/Ind-2001/d
MYA/3/2016	n/a	cattle	WRLFMD	Myanmar	ME-SA/Ind-2001/d
BAN/SI/Sh-234/2015*	KY077610	cattle	Univ Dhaka	Bangladesh	ME-SA/Ind-2001/d
BAN/TG/Ba-268/2015*	KY077621	cattle	Univ Dhaka	Bangladesh	ME-SA/Ind-2001/d
BAN/NL/Lo-245/2015*	KY077611	cattle	Univ Dhaka	Bangladesh	ME-SA/Ind-2001/d
BHU/2/2016	n/a	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
VIT/20/2016	n/a	cattle	WRLFMD	Vietnam	ME-SA/Ind-2001/d
Zabaikalskiy/3/RUS/2016*	n/a	cattle	ARRIAH	Russia	ME-SA/Ind-2001/d
Zabaikalskiy/1/RUS/2016*	n/a	cattle	ARRIAH	Russia	ME-SA/Ind-2001/d
Zabaikalskiy/2/RUS/2016*	n/a	cattle	ARRIAH	Russia	ME-SA/Ind-2001/d
170206/SKR/2017*	n/a	cattle	QIA	Republic of Korea (South Korea)	ME-SA/Ind-2001/d
BAN/GKa-236(pig)/2015*	KX712091	porcine	Univ Dhaka	Bangladesh	ME-SA/Ind-2001/d
NEP/17/2016	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
BHU/9/2016	n/a	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
BHU/10/2016	n/a	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
NEP/14/2016	n/a	water buffalo	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/12/2016	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/13/2016	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/5/2016	KY449053	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/28/2015	KY449052	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/17/2015	KY449050	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/19/2015	KY449051	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/6/2016	KY449054	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/11/2016	n/a	goats	WRLFMD	Nepal	ME-SA/Ind-2001/d

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label	accession	host(s)	lab	country	taxonomic information
NEP/10/2016	n/a	goats	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/10/2015	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/11/2015	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
UAE/1/2016	n/a	cattle	WRLFMD	United Arab Emirates	ME-SA/Ind-2001/d
SAU/10/2016	n/a	bovine	WRLFMD	Saudi Arabia	ME-SA/Ind-2001/d
UAE/1/2015	n/a	gazelle	WRLFMD	United Arab Emirates	ME-SA/Ind-2001/d
SAU/22/2015	n/a	bovine	WRLFMD	Saudi Arabia	ME-SA/Ind-2001/d
SAU/3/2016	n/a	bovine	WRLFMD	Saudi Arabia	ME-SA/Ind-2001/d
SAU/2/2016	n/a	bovine	WRLFMD	Saudi Arabia	ME-SA/Ind-2001/d
SAU/7/2016	n/a	bovine	WRLFMD	Saudi Arabia	ME-SA/Ind-2001/d
IND/166/2012*	KC506537	sheep	PD-FMD	India	ME-SA/Ind-2001/d
IND/20/2012*	KC506535	cattle	PD-FMD	India	ME-SA/Ind-2001/d
IND/1/2011*	KC506533	cattle	PD-FMD	India	ME-SA/Ind-2001/d
IND/86/2010*	KC506519	cattle	PD-FMD	India	ME-SA/Ind-2001/d
IND/129/2010*	KC506471	cattle	PD-FMD	India	ME-SA/Ind-2001/d
BAN/1/2009	HQ630676	cattle	WRLFMD	Bangladesh	ME-SA/Ind-2001/d
IND/32/2012*	KC506511	cattle	PD-FMD	India	ME-SA/Ind-2001/d
BHU/25/2009	KM921825	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
BHU/23/2009	KM921824	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
BHU/26/2009	KM921826	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
IND/149/2010*	KC506475	cattle	PD-FMD	India	ME-SA/Ind-2001/d
NEP/7/2010	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
IND/48/2010*	KC506461	cattle	PD-FMD	India	ME-SA/Ind-2001/d
IND/146/2010*	KC506473	cattle	PD-FMD	India	ME-SA/Ind-2001/d
IND/220/2010*	KC506481	sheep	PD-FMD	India	ME-SA/Ind-2001/d
BAN/9/2009	HQ630681	cattle	WRLFMD	Bangladesh	ME-SA/Ind-2001/d
BHU/16/2009	KM921821	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
BHU/3/2009	KM921814	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
IND/148/2010*	KC506474	cattle	PD-FMD	India	ME-SA/Ind-2001/d
BHU/18/2009	KM921822	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
NEP/5/2010	KM921843	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
IND/30/2010*	KC506456	water buffalo	PD-FMD	India	ME-SA/Ind-2001/d
NEP/3/2010	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
BHU/2/2009	KM921813	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
NEP/1/2010	n/a	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
NEP/6/2010	KM921844	cattle	WRLFMD	Nepal	ME-SA/Ind-2001/d
IND/181/2010*	KC506477	cattle	PD-FMD	India	ME-SA/Ind-2001/d
BHU/5/2009	KM921816	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
IND/29/2010*	KC506455	water buffalo	PD-FMD	India	ME-SA/Ind-2001/d
BHU/6/2009	KM921817	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
IND/132/2010*	KC506472	cattle	PD-FMD	India	ME-SA/Ind-2001/d
BHU/4/2009	KM921815	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
BHU/19/2009	KM921823	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
NEP/17/2010	KM921845	porcine	WRLFMD	Nepal	ME-SA/Ind-2001/d
BAN/27/2009	HQ630688	cattle	WRLFMD	Bangladesh	ME-SA/Ind-2001/d
BAN/26/2009	HQ630687	cattle	WRLFMD	Bangladesh	ME-SA/Ind-2001/d
IND/102/2010*	KC506466	cattle	PD-FMD	India	ME-SA/Ind-2001/d
IND/27/2012*	KC506510	cattle	PD-FMD	India	ME-SA/Ind-2001/d
IND/182/2010*	KC506478	cattle	PD-FMD	India	ME-SA/Ind-2001/d
BHU/10/2009	KM921820	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
BHU/9/2009	KM921819	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
TAI/189/87*	KY091288	bovine	TRRL	Thailand	SEA
IND/R2/75*	AF204276	n/a	PD-FMD	India	ME-SA
IND/53/79	AF292107	bovine	PD-FMD	India	ME-SA
UKG/35/2001	AJ539141	porcine	PIADC	United Kingdom	ME-SA/PanAsia
PAK/16/2010	KY091285	cattle	WRLFMD	Pakistan	ME-SA/PanAsia-2/PUN-10
IRN/88/2009	KY091282	n/a	WRLFMD	Iran	ME-SA/PanAsia-2/ANT-10
IRN/8/2005	KY091281	ovine	WRLFMD	Iran	ME-SA/PanAsia-2
TUR/257/2008*	n/a	n/a	FMDI-Ankara	Turkey	ME-SA/PanAsia-2/TER-08
TUR/264/2009*	n/a	n/a	FMDI-Ankara	Turkey	ME-SA/PanAsia-2/SAN-09

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<b>label</b>	<b>accession</b>	<b>host(s)</b>	<b>lab</b>	<b>country</b>	<b>taxonomic information</b>
IRN/31/2009	KY091284	cattle	WRLFMD	Iran	ME-SA/PanAsia-2/FAR-09
ISA/1/62	AJ303500	n/a	WRLFMD	Indonesia	ISA-1

\*, not a WRLFMD Reference Number

n/a, not available