

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

## Genotyping Report

FMDV serotype: O  
Country: Ethiopia  
Year: 2018, 2019  
Batch: WRLFMD/2019/00020  
No. of sequences: 13  
Report date: 9th May 2019  
Report generated by: Nick Knowles  
Report checked by: Jemma Wadsworth



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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:	ETH/72/2018
Sender reference:	ET- 10793
Location of origin:	Konda, Gawata, Kefa, SNNPRS
Country of origin:	Ethiopia
Date of collection:	15/03/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	09/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019

VIBASys IDs: sample 41495, genome 41496, sequence viba\_41497, sequencing info 41498

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_36234	ETH/16/2018	cattle	99.8	0	O	EA-3		
viba_41501	ETH/73/2018	cattle	99.8	0	O	EA-3		
viba_33519	ETH/3/2017	cattle	99.1	0	O	EA-3		
viba_33527	ETH/5/2017	cattle	99.1	0	O	EA-3		
viba_33523	ETH/4/2017	cattle	99.1	0	O	EA-3		
viba_33515	ETH/2/2017	cattle	98.7	0	O	EA-3		
viba_37029	SUD/1/2016	cattle	98.6	0	O	EA-3		
viba_34239	EGY/33/2017	cattle	98.4	0	O	EA-3		
viba_34187	EGY/13/2017	cattle	98.4	0	O	EA-3		
viba_34175	EGY/9/2017	cattle	98.3	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	87.7	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.2	0	O	EA-3		
viba_408	ETH/3/2004	cattle	84.8	0	O	EA-3		
viba_85	UGA/3/2002		84.1	0	O	EA-2		
viba_263	TAN/2/2004	bovine	84.1	0	O	EA-2		
viba_221	MAL/1/98		84.0	0	O	EA-2		
viba_617	IND/53/79	bovine	83.9	0	O	ME-SA		
viba_285	UKG/35/2001	porcine	83.6	0	O	ME-SA	PanAsia	
viba_302	CIV/8/99	bovine	83.6	0	O	WA		
viba_850	NEP/1/2015	cattle	83.3	1	O	ME-SA	PanAsia-2	KAT-15

Virus sample name:	ETH/73/2018
Sender reference:	ET-10794
Location of origin:	Gore, Ale, Ilubabore, Oromia
Country of origin:	Ethiopia
Date of collection:	20/03/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	09/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019
VIBASys IDs: sample 41499, genome 41500, sequence viba_41501, sequencing info 41502	

### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_41497	ETH/72/2018	cattle	99.8	0	O	EA-3		
viba_36234	ETH/16/2018	cattle	99.7	0	O	EA-3		
viba_33519	ETH/3/2017	cattle	98.9	0	O	EA-3		
viba_33527	ETH/5/2017	cattle	98.9	0	O	EA-3		
viba_33523	ETH/4/2017	cattle	98.9	0	O	EA-3		
viba_33515	ETH/2/2017	cattle	98.6	0	O	EA-3		
viba_37029	SUD/1/2016	cattle	98.4	0	O	EA-3		
viba_35536	Fayoum 3/Egy/2017		98.3	0	O	EA-3		
viba_34239	EGY/33/2017	cattle	98.3	0	O	EA-3		
viba_34187	EGY/13/2017	cattle	98.3	0	O	EA-3		

### 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_116	SUD/2/86	bovine	87.5	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.2	0	O	EA-3		
viba_408	ETH/3/2004	cattle	84.8	0	O	EA-3		
viba_221	MAL/1/98		84.2	0	O	EA-2		
viba_85	UGA/3/2002		83.9	0	O	EA-2		
viba_263	TAN/2/2004	bovine	83.9	0	O	EA-2		
viba_617	IND/53/79	bovine	83.8	0	O	ME-SA		
viba_302	CIV/8/99	bovine	83.5	0	O	WA		
viba_285	UKG/35/2001	porcine	83.4	0	O	ME-SA	PanAsia	
viba_850	NEP/1/2015	cattle	83.2	1	O	ME-SA	PanAsia-2	KAT-15

Virus sample name:	ETH/81/2018
Sender reference:	23802
Location of origin:	Dejen, Hintalo-Wajirat, North Western, Tigray
Country of origin:	Ethiopia
Date of collection:	11/10/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	10/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019
VIBASys IDs: sample 41503, genome 41504, sequence viba_41505, sequencing info 41506	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40447	ETH/20/2018	cattle	100.0	0	O	EA-3		
viba_40451	ETH/21/2018	cattle	100.0	0	O	EA-3		
viba_41521	ETH/4/2019	cattle	99.8	0	O	EA-3		
viba_41525	ETH/5/2019	cattle	99.5	0	O	EA-3		
viba_41529	ETH/6/2019	cattle	99.5	0	O	EA-3		
viba_40467	ETH/25/2018	cattle	99.4	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	99.4	0	O	EA-3		
viba_41509	ETH/82/2018	cattle	99.4	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	99.4	0	O	EA-3		
viba_41513	ETH/83/2018	cattle	99.4	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	88.3	0	O	EA-3		
viba_408	ETH/3/2004	cattle	86.5	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.9	0	O	EA-3		
viba_354	PAK/16/2010	cattle	85.0	0	O	ME-SA	PanAsia-2	PUN-10
viba_666	IRN/18/2010	cattle	84.9	0	O	ME-SA	PanAsia-2	BAL-09
viba_576	IND/R2/75		84.9	0	O	ME-SA		
viba_766	IRN/31/2009	cattle	84.9	0	O	ME-SA	PanAsia-2	FAR-09
viba_85	UGA/3/2002		84.7	0	O	EA-2		
viba_617	IND/53/79	bovine	84.7	0	O	ME-SA		
viba_523	K83/79		84.4	0	O	EA-1		

Virus sample name:	ETH/82/2018
Sender reference:	23803
Location of origin:	Wukro, Kilte-Awilailo, North Western, Tigray
Country of origin:	Ethiopia
Date of collection:	11/10/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	09/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019
VIBASys IDs: sample 41507, genome 41508, sequence viba_41509, sequencing info 41510	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40467	ETH/25/2018	cattle	100.0	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	100.0	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	100.0	0	O	EA-3		
viba_41513	ETH/83/2018	cattle	100.0	0	O	EA-3		
viba_40463	ETH/24/2018	cattle	100.0	0	O	EA-3		
viba_40439	ETH/18/2018	cattle	100.0	0	O	EA-3		
viba_40455	ETH/22/2018	cattle	100.0	0	O	EA-3		
viba_40474	ETH/37/2018	cattle	100.0	0	O	EA-3		
viba_40471	ETH/26/2018	cattle	100.0	0	O	EA-3		
viba_41529	ETH/6/2019	cattle	99.8	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	88.6	0	O	EA-3		
viba_408	ETH/3/2004	cattle	86.5	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.6	0	O	EA-3		
viba_85	UGA/3/2002		84.9	0	O	EA-2		
viba_576	IND/R2/75		84.9	0	O	ME-SA		
viba_523	K83/79		84.7	0	O	EA-1		
viba_354	PAK/16/2010	cattle	84.7	0	O	ME-SA	PanAsia-2	PUN-10
viba_617	IND/53/79	bovine	84.7	0	O	ME-SA		
viba_666	IRN/18/2010	cattle	84.6	0	O	ME-SA	PanAsia-2	BAL-09
viba_766	IRN/31/2009	cattle	84.6	0	O	ME-SA	PanAsia-2	FAR-09

Virus sample name:	ETH/83/2018
Sender reference:	23804
Location of origin:	Wukro, Kilde-Awilailo, North Western, Tigray
Country of origin:	Ethiopia
Date of collection:	11/10/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	09/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019

VIBASys IDs: sample 41511, genome 41512, sequence viba\_41513, sequencing info 41514

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40467	ETH/25/2018	cattle	100.0	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	100.0	0	O	EA-3		
viba_41509	ETH/82/2018	cattle	100.0	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	100.0	0	O	EA-3		
viba_40463	ETH/24/2018	cattle	100.0	0	O	EA-3		
viba_40439	ETH/18/2018	cattle	100.0	0	O	EA-3		
viba_40455	ETH/22/2018	cattle	100.0	0	O	EA-3		
viba_40474	ETH/37/2018	cattle	100.0	0	O	EA-3		
viba_40471	ETH/26/2018	cattle	100.0	0	O	EA-3		
viba_41529	ETH/6/2019	cattle	99.8	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	88.6	0	O	EA-3		
viba_408	ETH/3/2004	cattle	86.5	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.6	0	O	EA-3		
viba_85	UGA/3/2002		84.9	0	O	EA-2		
viba_576	IND/R2/75		84.9	0	O	ME-SA		
viba_523	K83/79		84.7	0	O	EA-1		
viba_354	PAK/16/2010	cattle	84.7	0	O	ME-SA	PanAsia-2	PUN-10
viba_617	IND/53/79	bovine	84.7	0	O	ME-SA		
viba_666	IRN/18/2010	cattle	84.6	0	O	ME-SA	PanAsia-2	BAL-09
viba_766	IRN/31/2009	cattle	84.6	0	O	ME-SA	PanAsia-2	FAR-09

Virus sample name:	ETH/84/2018
Sender reference:	23805
Location of origin:	Alogean, Asgede-Tsmbala, North Western, Tigray
Country of origin:	Ethiopia
Date of collection:	11/10/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	11/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019
VIBASys IDs: sample 41515, genome 41516, sequence viba_41517, sequencing info 41518	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_41529	ETH/6/2019	cattle	99.4	0	O	EA-3		
viba_40467	ETH/25/2018	cattle	99.2	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	99.2	0	O	EA-3		
viba_41505	ETH/81/2018	cattle	99.2	0	O	EA-3		
viba_41509	ETH/82/2018	cattle	99.2	0	O	EA-3		
viba_40447	ETH/20/2018	cattle	99.2	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	99.2	0	O	EA-3		
viba_41513	ETH/83/2018	cattle	99.2	0	O	EA-3		
viba_40463	ETH/24/2018	cattle	99.2	0	O	EA-3		
viba_40439	ETH/18/2018	cattle	99.2	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	87.8	0	O	EA-3		
viba_408	ETH/3/2004	cattle	86.1	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.5	0	O	EA-3		
viba_354	PAK/16/2010	cattle	84.6	0	O	ME-SA	PanAsia-2	PUN-10
viba_666	IRN/18/2010	cattle	84.4	0	O	ME-SA	PanAsia-2	BAL-09
viba_576	IND/R2/75		84.4	0	O	ME-SA		
viba_766	IRN/31/2009	cattle	84.4	0	O	ME-SA	PanAsia-2	FAR-09
viba_505	TUR/264/2009		84.3	0	O	ME-SA	PanAsia-2	SAN-09
viba_617	IND/53/79	bovine	84.3	0	O	ME-SA		
viba_491	TUR/257/2008		84.3	0	O	ME-SA	PanAsia-2	TER-08

Virus sample name:	ETH/4/2019
Sender reference:	4586
Location of origin:	Korem, Korem, Southern, Tigray
Country of origin:	Ethiopia
Date of collection:	07/02/2019
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	11/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019
VIBASys IDs: sample 41519, genome 41520, sequence viba_41521, sequencing info 41522	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_41505	ETH/81/2018	cattle	99.8	0	O	EA-3		
viba_40447	ETH/20/2018	cattle	99.8	0	O	EA-3		
viba_40451	ETH/21/2018	cattle	99.8	0	O	EA-3		
viba_41525	ETH/5/2019	cattle	99.4	0	O	EA-3		
viba_41529	ETH/6/2019	cattle	99.4	0	O	EA-3		
viba_40467	ETH/25/2018	cattle	99.2	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	99.2	0	O	EA-3		
viba_41509	ETH/82/2018	cattle	99.2	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	99.2	0	O	EA-3		
viba_41513	ETH/83/2018	cattle	99.2	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	88.2	0	O	EA-3		
viba_408	ETH/3/2004	cattle	86.4	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.8	0	O	EA-3		
viba_354	PAK/16/2010	cattle	84.9	0	O	ME-SA	PanAsia-2	PUN-10
viba_666	IRN/18/2010	cattle	84.7	0	O	ME-SA	PanAsia-2	BAL-09
viba_576	IND/R2/75		84.7	0	O	ME-SA		
viba_766	IRN/31/2009	cattle	84.7	0	O	ME-SA	PanAsia-2	FAR-09
viba_85	UGA/3/2002		84.6	0	O	EA-2		
viba_617	IND/53/79	bovine	84.6	0	O	ME-SA		
viba_505	TUR/264/2009		84.3	0	O	ME-SA	PanAsia-2	SAN-09



Virus sample name:	ETH/5/2019
Sender reference:	4585
Location of origin:	Raya Alamata, Rayo, Tigray
Country of origin:	Ethiopia
Date of collection:	07/02/2019
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy2
Harvest date of material:	12/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019

VIBASys IDs: sample 41523, genome 41524, sequence viba\_41525, sequencing info 41526

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_41505	ETH/81/2018	cattle	99.5	0	O	EA-3		
viba_40447	ETH/20/2018	cattle	99.5	0	O	EA-3		
viba_40451	ETH/21/2018	cattle	99.5	0	O	EA-3		
viba_41521	ETH/4/2019	cattle	99.4	0	O	EA-3		
viba_41529	ETH/6/2019	cattle	99.1	0	O	EA-3		
viba_40467	ETH/25/2018	cattle	98.9	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	98.9	0	O	EA-3		
viba_41509	ETH/82/2018	cattle	98.9	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	98.9	0	O	EA-3		
viba_41513	ETH/83/2018	cattle	98.9	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	87.8	0	O	EA-3		
viba_408	ETH/3/2004	cattle	86.7	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.1	0	O	EA-3		
viba_354	PAK/16/2010	cattle	84.9	0	O	ME-SA	PanAsia-2	PUN-10
viba_617	IND/53/79	bovine	84.9	0	O	ME-SA		
viba_85	UGA/3/2002		84.7	0	O	EA-2		
viba_666	IRN/18/2010	cattle	84.7	0	O	ME-SA	PanAsia-2	BAL-09
viba_576	IND/R2/75		84.7	0	O	ME-SA		
viba_766	IRN/31/2009	cattle	84.7	0	O	ME-SA	PanAsia-2	FAR-09
viba_523	K83/79		84.5	0	O	EA-1		

Virus sample name:	ETH/6/2019
Sender reference:	32297
Location of origin:	Senkata, Saisi Tsaida Imba, Eastern, Tigray
Country of origin:	Ethiopia
Date of collection:	19/02/2019
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	11/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019
VIBASys IDs: sample 41527, genome 41528, sequence viba_41529, sequencing info 41530	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40467	ETH/25/2018	cattle	99.8	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	99.8	0	O	EA-3		
viba_41509	ETH/82/2018	cattle	99.8	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	99.8	0	O	EA-3		
viba_41513	ETH/83/2018	cattle	99.8	0	O	EA-3		
viba_40463	ETH/24/2018	cattle	99.8	0	O	EA-3		
viba_40439	ETH/18/2018	cattle	99.8	0	O	EA-3		
viba_40455	ETH/22/2018	cattle	99.8	0	O	EA-3		
viba_40474	ETH/37/2018	cattle	99.8	0	O	EA-3		
viba_40471	ETH/26/2018	cattle	99.8	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	88.5	0	O	EA-3		
viba_408	ETH/3/2004	cattle	86.4	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.8	0	O	EA-3		
viba_576	IND/R2/75		85.0	0	O	ME-SA		
viba_354	PAK/16/2010	cattle	84.9	0	O	ME-SA	PanAsia-2	PUN-10
viba_85	UGA/3/2002		84.7	0	O	EA-2		
viba_666	IRN/18/2010	cattle	84.7	0	O	ME-SA	PanAsia-2	BAL-09
viba_766	IRN/31/2009	cattle	84.7	0	O	ME-SA	PanAsia-2	FAR-09
viba_505	TUR/264/2009		84.6	0	O	ME-SA	PanAsia-2	SAN-09
viba_617	IND/53/79	bovine	84.6	0	O	ME-SA		

Virus sample name:	ETH/7/2019
Sender reference:	32300
Location of origin:	Teki"a, Imba Alaje, Southern, Tigray
Country of origin:	Ethiopia
Date of collection:	19/02/2019
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	2
Material submitted for sequencing:	BTy1
Harvest date of material:	11/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019

VIBASys IDs: sample 41531, genome 41532, sequence viba\_41533, sequencing info 41534

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_41537	ETH/8/2019	cattle	99.7	2	O	EA-3		
viba_41541	ETH/9/2019	cattle	99.5	0	O	EA-3		
viba_41505	ETH/81/2018	cattle	98.3	0	O	EA-3		
viba_40447	ETH/20/2018	cattle	98.3	0	O	EA-3		
viba_40451	ETH/21/2018	cattle	98.3	0	O	EA-3		
viba_41521	ETH/4/2019	cattle	98.1	0	O	EA-3		
viba_40467	ETH/25/2018	cattle	97.9	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	97.9	0	O	EA-3		
viba_41509	ETH/82/2018	cattle	97.9	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	97.9	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	88.0	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.2	0	O	EA-3		
viba_523	K83/79		84.4	0	O	EA-1		
viba_354	PAK/16/2010	cattle	84.4	0	O	ME-SA	PanAsia-2	PUN-10
viba_617	IND/53/79	bovine	84.4	0	O	ME-SA		
viba_766	IRN/31/2009	cattle	84.4	0	O	ME-SA	PanAsia-2	FAR-09
viba_285	UKG/35/2001	porcine	84.2	0	O	ME-SA	PanAsia	
viba_666	IRN/18/2010	cattle	84.1	0	O	ME-SA	PanAsia-2	BAL-09
viba_85	UGA/3/2002		84.0	0	O	EA-2		

Virus sample name:	ETH/8/2019
Sender reference:	32309
Location of origin:	Teki"a, Imba Alaje, Southern, Tigray
Country of origin:	Ethiopia
Date of collection:	19/02/2019
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	2
Material submitted for sequencing:	BTy1
Harvest date of material:	11/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019

VIBASys IDs: sample 41535, genome 41536, sequence viba\_41537, sequencing info 41538

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_41533	ETH/7/2019	cattle	99.7	2	O	EA-3		
viba_41541	ETH/9/2019	cattle	99.5	0	O	EA-3		
viba_41505	ETH/81/2018	cattle	98.4	0	O	EA-3		
viba_40447	ETH/20/2018	cattle	98.4	0	O	EA-3		
viba_40451	ETH/21/2018	cattle	98.4	0	O	EA-3		
viba_41521	ETH/4/2019	cattle	98.3	0	O	EA-3		
viba_40467	ETH/25/2018	cattle	98.1	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	98.1	0	O	EA-3		
viba_41509	ETH/82/2018	cattle	98.1	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	98.1	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	88.0	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.2	0	O	EA-3		
viba_523	K83/79		84.4	0	O	EA-1		
viba_354	PAK/16/2010	cattle	84.4	0	O	ME-SA	PanAsia-2	PUN-10
viba_617	IND/53/79	bovine	84.4	0	O	ME-SA		
viba_766	IRN/31/2009	cattle	84.4	0	O	ME-SA	PanAsia-2	FAR-09
viba_285	UKG/35/2001	porcine	84.2	0	O	ME-SA	PanAsia	
viba_666	IRN/18/2010	cattle	84.1	0	O	ME-SA	PanAsia-2	BAL-09
viba_85	UGA/3/2002		84.0	0	O	EA-2		

Virus sample name:	ETH/9/2019
Sender reference:	32313
Location of origin:	Ayida, Imba Alaje, Southern, Tigray
Country of origin:	Ethiopia
Date of collection:	19/02/2019
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	10/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019
VIBASys IDs: sample 41539, genome 41540, sequence viba_41541, sequencing info 41542	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_41537	ETH/8/2019	cattle	99.5	2	O	EA-3		
viba_41533	ETH/7/2019	cattle	99.5	2	O	EA-3		
viba_41505	ETH/81/2018	cattle	98.4	0	O	EA-3		
viba_40447	ETH/20/2018	cattle	98.4	0	O	EA-3		
viba_40451	ETH/21/2018	cattle	98.4	0	O	EA-3		
viba_41521	ETH/4/2019	cattle	98.3	0	O	EA-3		
viba_40467	ETH/25/2018	cattle	98.1	0	O	EA-3		
viba_40443	ETH/19/2018	cattle	98.1	0	O	EA-3		
viba_41509	ETH/82/2018	cattle	98.1	0	O	EA-3		
viba_40459	ETH/23/2018	cattle	98.1	0	O	EA-3		

#### 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_116	SUD/2/86	bovine	88.3	0	O	EA-3		
viba_408	ETH/3/2004	cattle	86.1	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.5	0	O	EA-3		
viba_354	PAK/16/2010	cattle	84.7	0	O	ME-SA	PanAsia-2	PUN-10
viba_617	IND/53/79	bovine	84.7	0	O	ME-SA		
viba_766	IRN/31/2009	cattle	84.5	0	O	ME-SA	PanAsia-2	FAR-09
viba_523	K83/79		84.4	0	O	EA-1		
viba_285	UKG/35/2001	porcine	84.3	0	O	ME-SA	PanAsia	
viba_293	BHU/3/2009	cattle	84.3	0	O	ME-SA	Ind-2001	d
viba_85	UGA/3/2002		84.2	0	O	EA-2		

Virus sample name:	ETH/14/2019
Sender reference:	ET-8442
Location of origin:	Mololcho, Shoshoge, Hadiya zone, SNNPRS
Country of origin:	Ethiopia
Date of collection:	28/02/2019
Host species:	cattle
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	24/04/2019
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	07/05/2019
Created:	09/05/2019
Last updated:	09/05/2019
VIBASys IDs: sample 41543, genome 41544, sequence viba_41545, sequencing info 41546	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33820	ETH/25/2016	bovine	97.0	0	O	EA-4		
viba_33864	ETH/51/2016	bovine	97.0	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	97.0	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	97.0	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	97.0	0	O	EA-4		
viba_33836	ETH/34/2016	bovine	97.0	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	97.0	0	O	EA-4		
viba_33856	ETH/49/2016	bovine	97.0	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	96.7	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	96.7	0	O	EA-4		

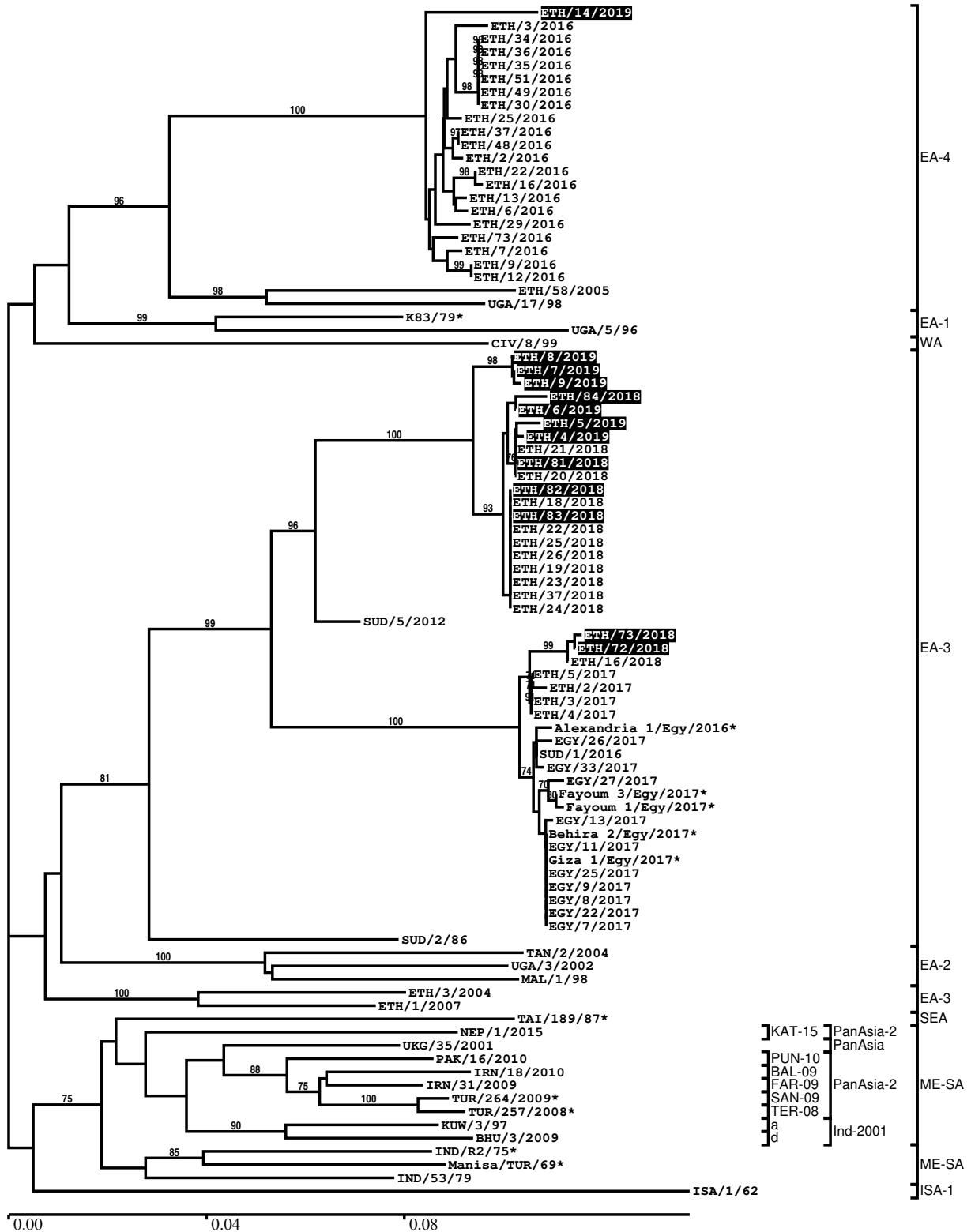
#### Most Closely Related Prototype Sequences

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_50	UGA/17/98		87.2	0	O	EA-4		
viba_621	ETH/58/2005	bovine	86.2	0	O	EA-4		
viba_523	K83/79		85.2	0	O	EA-1		
viba_116	SUD/2/86	bovine	85.2	0	O	EA-3		
viba_854	ETH/1/2007	cattle	84.4	0	O	EA-3		
viba_408	ETH/3/2004	cattle	84.2	0	O	EA-3		
viba_705	KUW/3/97	bovine	84.2	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	83.9	0	O	ME-SA	PanAsia	
viba_359	Manisa/TUR/69		83.9	0	O	ME-SA		
viba_580	UGA/5/96	bovine	83.8	0	O	EA-1		

Report on FMDV O in Ethiopia in 2018, 2019

Batch: WRLFMD/2019/00020



\*, not a WRLFMD Reference Number

## Analysis Parameters

VP1 subsequence extractor:	vp1_O
Query sequence set:	WRLFMD/2019/00020-Ethiopia-O (13 sequences)
Sequence database set:	allseqs_O (4484 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:	23
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
ETH/14/2019	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/3/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/34/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/36/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/35/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/51/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/49/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/30/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/25/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/37/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/48/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/2/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/22/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/16/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/13/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/6/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/29/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/73/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/7/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/9/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/12/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/58/2005	FJ798141	bovine	WRLFMD	Ethiopia	EA-4
UGA/17/98	HM211075	n/a	WRLFMD	Uganda	EA-4
K83/79*	AJ303511	n/a	WRLFMD	Kenya	EA-1
UGA/5/96	AJ296327	bovine	WRLFMD	Uganda	EA-1
CIV/8/99	AJ303485	bovine	WRLFMD	Cote d'Ivoire	WA
ETH/8/2019	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/7/2019	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/9/2019	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/84/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/6/2019	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/5/2019	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/4/2019	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/21/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/81/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/20/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3

*continued on next page*



label	accession	host(s)	lab	country	taxonomic information
ETH/82/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/18/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/83/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/22/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/25/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/26/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/19/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/23/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/37/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/24/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
SUD/5/2012	MK422560	cattle	WRLFMD	Sudan	EA-3
ETH/73/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/72/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/16/2018	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/5/2017	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/2/2017	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/3/2017	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/4/2017	n/a	cattle	WRLFMD	Ethiopia	EA-3
Alexandria 1/Egy/2016*	MF322680	n/a	MEVAC	Egypt	EA-3
EGY/26/2017	n/a	cattle	WRLFMD	Egypt	EA-3
SUD/1/2016	MK422563	cattle	WRLFMD	Sudan	EA-3
EGY/33/2017	n/a	cattle	WRLFMD	Egypt	EA-3
EGY/27/2017	n/a	cattle	WRLFMD	Egypt	EA-3
Fayoum 3/Egy/2017*	MF322690	n/a	MEVAC	Egypt	EA-3
Fayoum 1/Egy/2017*	MF322688	n/a	MEVAC	Egypt	EA-3
EGY/13/2017	n/a	cattle	WRLFMD	Egypt	EA-3
Behira 2/Egy/2017*	MF322687	n/a	MEVAC	Egypt	EA-3
EGY/11/2017	n/a	water buffalo	WRLFMD	Egypt	EA-3
Giza 1/Egy/2017*	MF322682	n/a	MEVAC	Egypt	EA-3
EGY/25/2017	n/a	cattle	WRLFMD	Egypt	EA-3
EGY/9/2017	n/a	cattle	WRLFMD	Egypt	EA-3
EGY/8/2017	n/a	cattle	WRLFMD	Egypt	EA-3
EGY/22/2017	n/a	water buffalo	WRLFMD	Egypt	EA-3
EGY/7/2017	n/a	cattle	WRLFMD	Egypt	EA-3
SUD/2/86	DQ165075	bovine	WRLFMD	Sudan	EA-3
TAN/2/2004	KF561679	bovine	WRLFMD	Tanzania	EA-2
UGA/3/2002	DQ165077	n/a	WRLFMD	Uganda	EA-2
MAL/1/98	DQ165074	n/a	WRLFMD	Malawi	EA-2
ETH/3/2004	FJ798109	cattle	WRLFMD	Ethiopia	EA-3
ETH/1/2007	FJ798137	cattle	WRLFMD	Ethiopia	EA-3
TAI/189/87*	KY091288	bovine	TRRL	Thailand	SEA
NEP/1/2015	n/a	cattle	WRLFMD	Nepal	ME-SA/PanAsia-2/KAT-15
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/18/2010	KY091283	cattle	WRLFMD	Iran	ME-SA/PanAsia-2/BAL-09
IRN/31/2009	KY091284	cattle	WRLFMD	Iran	ME-SA/PanAsia-2/FAR-09
TUR/264/2009*	n/a	n/a	FMDI-Ankara	Turkey	ME-SA/PanAsia-2/SAN-09
TUR/257/2008*	n/a	n/a	FMDI-Ankara	Turkey	ME-SA/PanAsia-2/TER-08
KUW/3/97	DQ164904	bovine	WRLFMD	Kuwait	ME-SA/Ind-2001/a
BHU/3/2009	KM921814	cattle	WRLFMD	Bhutan	ME-SA/Ind-2001/d
IND/R2/75*	AF204276	n/a	PD-FMD	India	ME-SA
Manisa/TUR/69*	AY593823	n/a	PIADC	Turkey	ME-SA
IND/53/79	AF292107	bovine	PD-FMD	India	ME-SA
ISA/1/62	AJ303500	n/a	WRLFMD	Indonesia	ISA-1

\*, not a WRLFMD Reference Number

n/a, not available