

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

## Genotyping Report

FMDV serotype: O  
Country: Ethiopia  
Year: 2016  
Batch: WRLFMD/2017/00009  
No. of sequences: 14  
Report date: 22nd June 2017  
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:	ETH/25/2016
Sender reference:	ETH/NVI/FMD/14/16
Location of origin:	KOKA
Country of origin:	Ethiopia
Date of collection:	03/01/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	24/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33818, genome 33819, sequence viba_33820, sequencing info 33821	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33463	ETH/2/2016	cattle	99.4	0	O	EA-4		
viba_33856	ETH/49/2016	bovine	99.1	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	99.1	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	99.1	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	99.1	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	99.1	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	99.1	0	O	EA-4		
viba_33836	ETH/34/2016	bovine	99.1	0	O	EA-4		
viba_33475	ETH/6/2016	cattle	99.1	0	O	EA-4		
viba_33864	ETH/51/2016	bovine	99.1	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		88.5	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.4	0	O	EA-4		
viba_116	SUD/2/86	bovine	87.3	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.6	0	O	EA-3		
viba_408	ETH/3/2004	cattle	86.0	0	O	EA-3		
viba_523	K83/79		85.8	0	O	EA-1		
viba_285	UKG/35/2001	porcine	85.8	0	O	ME-SA	PanAsia	
viba_705	KUW/3/97	bovine	85.7	0	O	ME-SA	Ind-2001	a
viba_62	ETH/2/2006	bovine	85.7	0	O	EA-3		
viba_68	TAI/189/87	bovine	85.3	0	O	SEA		

Virus sample name:	ETH/29/2016
Sender reference:	ETH/NVI/FMD/15/16
Location of origin:	ADDIS ABABA
Country of origin:	Ethiopia
Date of collection:	03/03/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	24/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33822, genome 33823, sequence viba_33824, sequencing info 33825	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33832	ETH/32/2016	bovine	100.0	0	O	EA-4		
viba_33860	ETH/50/2016	bovine	99.8	0	O	EA-4		
viba_33868	ETH/61/2016	bovine	99.8	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.2	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	98.9	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	98.9	0	O	EA-4		
viba_33856	ETH/49/2016	bovine	98.6	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	98.6	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	98.6	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	98.6	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		88.9	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.3	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.8	0	O	EA-3		
viba_523	K83/79		85.7	0	O	EA-1		
viba_854	ETH/1/2007	cattle	85.5	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.4	0	O	ME-SA	Ind-2001	a
viba_408	ETH/3/2004	cattle	85.4	0	O	EA-3		
viba_62	ETH/2/2006	bovine	85.2	0	O	EA-3		
viba_359	Manisa/TUR/69		85.1	0	O	ME-SA		
viba_285	UKG/35/2001	porcine	85.1	0	O	ME-SA	PanAsia	

Virus sample name:	ETH/30/2016
Sender reference:	ETH/NVI/FMD/05/16
Location of origin:	ALEMTENA
Country of origin:	Ethiopia
Date of collection:	16/03/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	25/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33826, genome 33827, sequence viba_33828, sequencing info 33829	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33856	ETH/49/2016	bovine	100.0	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	100.0	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	100.0	0	O	EA-4		
viba_33836	ETH/34/2016	bovine	100.0	0	O	EA-4		
viba_33864	ETH/51/2016	bovine	100.0	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.4	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	99.1	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	99.1	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	99.1	0	O	EA-4		
viba_33475	ETH/6/2016	cattle	99.1	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		88.5	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.4	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.6	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.0	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_523	K83/79		85.5	0	O	EA-1		
viba_62	ETH/2/2006	bovine	85.4	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.2	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	85.2	0	O	ME-SA	PanAsia	
viba_68	TAI/189/87	bovine	85.0	0	O	SEA		

Virus sample name:	ETH/32/2016
Sender reference:	ETH/NVI/FMD/11/16
Location of origin:	DEBRE BIRHAM
Country of origin:	Ethiopia
Date of collection:	12/04/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	25/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33830, genome 33831, sequence viba_33832, sequencing info 33833	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33824	ETH/29/2016	bovine	100.0	0	O	EA-4		
viba_33860	ETH/50/2016	bovine	99.8	0	O	EA-4		
viba_33868	ETH/61/2016	bovine	99.8	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.2	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	98.9	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	98.9	0	O	EA-4		
viba_33856	ETH/49/2016	bovine	98.6	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	98.6	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	98.6	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	98.6	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		88.9	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.3	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.8	0	O	EA-3		
viba_523	K83/79		85.7	0	O	EA-1		
viba_854	ETH/1/2007	cattle	85.5	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.4	0	O	ME-SA	Ind-2001	a
viba_408	ETH/3/2004	cattle	85.4	0	O	EA-3		
viba_62	ETH/2/2006	bovine	85.2	0	O	EA-3		
viba_359	Manisa/TUR/69		85.1	0	O	ME-SA		
viba_285	UKG/35/2001	porcine	85.1	0	O	ME-SA	PanAsia	

Virus sample name:	ETH/34/2016
Sender reference:	ETH/NVI/FMD/06/16
Location of origin:	ADDIS ABABA
Country of origin:	Ethiopia
Date of collection:	27/06/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	25/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33834, genome 33835, sequence viba_33836, sequencing info 33837	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33856	ETH/49/2016	bovine	100.0	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	100.0	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	100.0	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	100.0	0	O	EA-4		
viba_33864	ETH/51/2016	bovine	100.0	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.4	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	99.1	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	99.1	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	99.1	0	O	EA-4		
viba_33475	ETH/6/2016	cattle	99.1	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		88.5	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.4	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.6	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.0	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_523	K83/79		85.5	0	O	EA-1		
viba_62	ETH/2/2006	bovine	85.4	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.2	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	85.2	0	O	ME-SA	PanAsia	
viba_68	TAI/189/87	bovine	85.0	0	O	SEA		

Virus sample name:	ETH/35/2016
Sender reference:	ETH/NVI/FMD/17/16
Location of origin:	ADDIS ABABA
Country of origin:	Ethiopia
Date of collection:	27/06/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	24/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33838, genome 33839, sequence viba_33840, sequencing info 33841	

### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33856	ETH/49/2016	bovine	100.0	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	100.0	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	100.0	0	O	EA-4		
viba_33836	ETH/34/2016	bovine	100.0	0	O	EA-4		
viba_33864	ETH/51/2016	bovine	100.0	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.4	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	99.1	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	99.1	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	99.1	0	O	EA-4		
viba_33475	ETH/6/2016	cattle	99.1	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		88.5	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.4	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.6	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.0	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_523	K83/79		85.5	0	O	EA-1		
viba_62	ETH/2/2006	bovine	85.4	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.2	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	85.2	0	O	ME-SA	PanAsia	
viba_68	TAI/189/87	bovine	85.0	0	O	SEA		

Virus sample name:	ETH/36/2016
Sender reference:	ETH/NVI/FMD/07/16
Location of origin:	MOJO
Country of origin:	Ethiopia
Date of collection:	08/08/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	25/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33842, genome 33843, sequence viba_33844, sequencing info 33845	

### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33856	ETH/49/2016	bovine	100.0	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	100.0	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	100.0	0	O	EA-4		
viba_33836	ETH/34/2016	bovine	100.0	0	O	EA-4		
viba_33864	ETH/51/2016	bovine	100.0	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.4	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	99.1	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	99.1	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	99.1	0	O	EA-4		
viba_33475	ETH/6/2016	cattle	99.1	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		88.5	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.4	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.6	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.0	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_523	K83/79		85.5	0	O	EA-1		
viba_62	ETH/2/2006	bovine	85.4	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.2	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	85.2	0	O	ME-SA	PanAsia	
viba_68	TAI/189/87	bovine	85.0	0	O	SEA		



Virus sample name:	ETH/37/2016
Sender reference:	ETH/NVI/FMD/18/16
Location of origin:	MOJO
Country of origin:	Ethiopia
Date of collection:	08/08/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy2
Harvest date of material:	01/06/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33846, genome 33847, sequence viba_33848, sequencing info 33849	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33852	ETH/48/2016	bovine	100.0	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.7	0	O	EA-4		
viba_33856	ETH/49/2016	bovine	99.1	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	99.1	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	99.1	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	99.1	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	99.1	0	O	EA-4		
viba_33836	ETH/34/2016	bovine	99.1	0	O	EA-4		
viba_33475	ETH/6/2016	cattle	99.1	0	O	EA-4		
viba_33864	ETH/51/2016	bovine	99.1	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		88.5	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.7	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.9	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.0	0	O	EA-3		
viba_523	K83/79		85.8	0	O	EA-1		
viba_62	ETH/2/2006	bovine	85.7	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.5	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	85.5	0	O	ME-SA	PanAsia	
viba_359	Manisa/TUR/69		85.4	0	O	ME-SA		

Virus sample name:	ETH/48/2016
Sender reference:	ETH/NVI/FMD/08/16
Location of origin:	DEBRE BIRHAM
Country of origin:	Ethiopia
Date of collection:	13/10/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy2
Harvest date of material:	26/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33850, genome 33851, sequence viba_33852, sequencing info 33853	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33848	ETH/37/2016	bovine	100.0	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.7	0	O	EA-4		
viba_33856	ETH/49/2016	bovine	99.1	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	99.1	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	99.1	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	99.1	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	99.1	0	O	EA-4		
viba_33836	ETH/34/2016	bovine	99.1	0	O	EA-4		
viba_33475	ETH/6/2016	cattle	99.1	0	O	EA-4		
viba_33864	ETH/51/2016	bovine	99.1	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		88.5	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.7	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.9	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.0	0	O	EA-3		
viba_523	K83/79		85.8	0	O	EA-1		
viba_62	ETH/2/2006	bovine	85.7	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.5	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	85.5	0	O	ME-SA	PanAsia	
viba_359	Manisa/TUR/69		85.4	0	O	ME-SA		

Virus sample name:	ETH/49/2016
Sender reference:	ETH/NVI/FMD/19/16
Location of origin:	DEBRE BIRHAM
Country of origin:	Ethiopia
Date of collection:	13/10/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	25/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33854, genome 33855, sequence viba_33856, sequencing info 33857	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33828	ETH/30/2016	bovine	100.0	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	100.0	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	100.0	0	O	EA-4		
viba_33836	ETH/34/2016	bovine	100.0	0	O	EA-4		
viba_33864	ETH/51/2016	bovine	100.0	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.4	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	99.1	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	99.1	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	99.1	0	O	EA-4		
viba_33475	ETH/6/2016	cattle	99.1	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		88.5	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.4	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.6	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.0	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_523	K83/79		85.5	0	O	EA-1		
viba_62	ETH/2/2006	bovine	85.4	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.2	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	85.2	0	O	ME-SA	PanAsia	
viba_68	TAI/189/87	bovine	85.0	0	O	SEA		

Virus sample name:	ETH/50/2016
Sender reference:	ETH/NVI/FMD/09/16
Location of origin:	DEBRE BIRHAM
Country of origin:	Ethiopia
Date of collection:	21/10/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy2
Harvest date of material:	26/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33858, genome 33859, sequence viba_33860, sequencing info 33861	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33868	ETH/61/2016	bovine	100.0	0	O	EA-4		
viba_33832	ETH/32/2016	bovine	99.8	0	O	EA-4		
viba_33824	ETH/29/2016	bovine	99.8	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.1	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	98.7	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	98.7	0	O	EA-4		
viba_33856	ETH/49/2016	bovine	98.4	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	98.4	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	98.4	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	98.4	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		88.7	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.1	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.8	0	O	EA-3		
viba_523	K83/79		85.7	0	O	EA-1		
viba_854	ETH/1/2007	cattle	85.5	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.4	0	O	ME-SA	Ind-2001	a
viba_408	ETH/3/2004	cattle	85.4	0	O	EA-3		
viba_62	ETH/2/2006	bovine	85.2	0	O	EA-3		
viba_359	Manisa/TUR/69		85.1	0	O	ME-SA		
viba_285	UKG/35/2001	porcine	85.1	0	O	ME-SA	PanAsia	

Virus sample name:	ETH/51/2016
Sender reference:	ETH/NVI/FMD/20/16
Location of origin:	DEBRE BIRHAM
Country of origin:	Ethiopia
Date of collection:	21/10/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	25/05/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33862, genome 33863, sequence viba_33864, sequencing info 33865	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33856	ETH/49/2016	bovine	100.0	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	100.0	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	100.0	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	100.0	0	O	EA-4		
viba_33836	ETH/34/2016	bovine	100.0	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.4	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	99.1	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	99.1	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	99.1	0	O	EA-4		
viba_33475	ETH/6/2016	cattle	99.1	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		88.5	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.4	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.6	0	O	EA-3		
viba_854	ETH/1/2007	cattle	86.0	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.7	0	O	EA-3		
viba_523	K83/79		85.5	0	O	EA-1		
viba_62	ETH/2/2006	bovine	85.4	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.2	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	85.2	0	O	ME-SA	PanAsia	
viba_68	TAI/189/87	bovine	85.0	0	O	SEA		

Virus sample name:	ETH/61/2016
Sender reference:	ETH/NVI/FMD/21/16
Location of origin:	DEBRE BIRHAM
Country of origin:	Ethiopia
Date of collection:	23/11/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	03/06/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33866, genome 33867, sequence viba_33868, sequencing info 33869	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33860	ETH/50/2016	bovine	100.0	0	O	EA-4		
viba_33832	ETH/32/2016	bovine	99.8	0	O	EA-4		
viba_33824	ETH/29/2016	bovine	99.8	0	O	EA-4		
viba_33463	ETH/2/2016	cattle	99.1	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	98.7	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	98.7	0	O	EA-4		
viba_33856	ETH/49/2016	bovine	98.4	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	98.4	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	98.4	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	98.4	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		88.7	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.1	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.8	0	O	EA-3		
viba_523	K83/79		85.7	0	O	EA-1		
viba_854	ETH/1/2007	cattle	85.5	0	O	EA-3		
viba_705	KUW/3/97	bovine	85.4	0	O	ME-SA	Ind-2001	a
viba_408	ETH/3/2004	cattle	85.4	0	O	EA-3		
viba_62	ETH/2/2006	bovine	85.2	0	O	EA-3		
viba_359	Manisa/TUR/69		85.1	0	O	ME-SA		
viba_285	UKG/35/2001	porcine	85.1	0	O	ME-SA	PanAsia	

Virus sample name:	ETH/73/2016
Sender reference:	ETH/NVI/FMD/59/16
Location of origin:	MOGORO
Country of origin:	Ethiopia
Date of collection:	20/12/2016
Host species:	bovine
Serotype:	O
Topotype:	EA-4
Lineage:	
Sublineage:	
Sequence length:	636
Ambiguities:	0
Material submitted for sequencing:	BTy2
Harvest date of material:	15/06/2017
Primers:	O-1C244F/EUR-2B52R; O-1C272F/EUR-2B52R
Received for sequencing:	19/06/2017
Created:	22/06/2017
Last updated:	22/06/2017
VIBASys IDs: sample 33870, genome 33871, sequence viba_33872, sequencing info 33873	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_33463	ETH/2/2016	cattle	99.2	0	O	EA-4		
viba_33856	ETH/49/2016	bovine	98.9	0	O	EA-4		
viba_33820	ETH/25/2016	bovine	98.9	0	O	EA-4		
viba_33828	ETH/30/2016	bovine	98.9	0	O	EA-4		
viba_33848	ETH/37/2016	bovine	98.9	0	O	EA-4		
viba_33487	ETH/9/2016	cattle	98.9	0	O	EA-4		
viba_33852	ETH/48/2016	bovine	98.9	0	O	EA-4		
viba_33840	ETH/35/2016	bovine	98.9	0	O	EA-4		
viba_33495	ETH/12/2016	cattle	98.9	0	O	EA-4		
viba_33844	ETH/36/2016	bovine	98.9	0	O	EA-4		

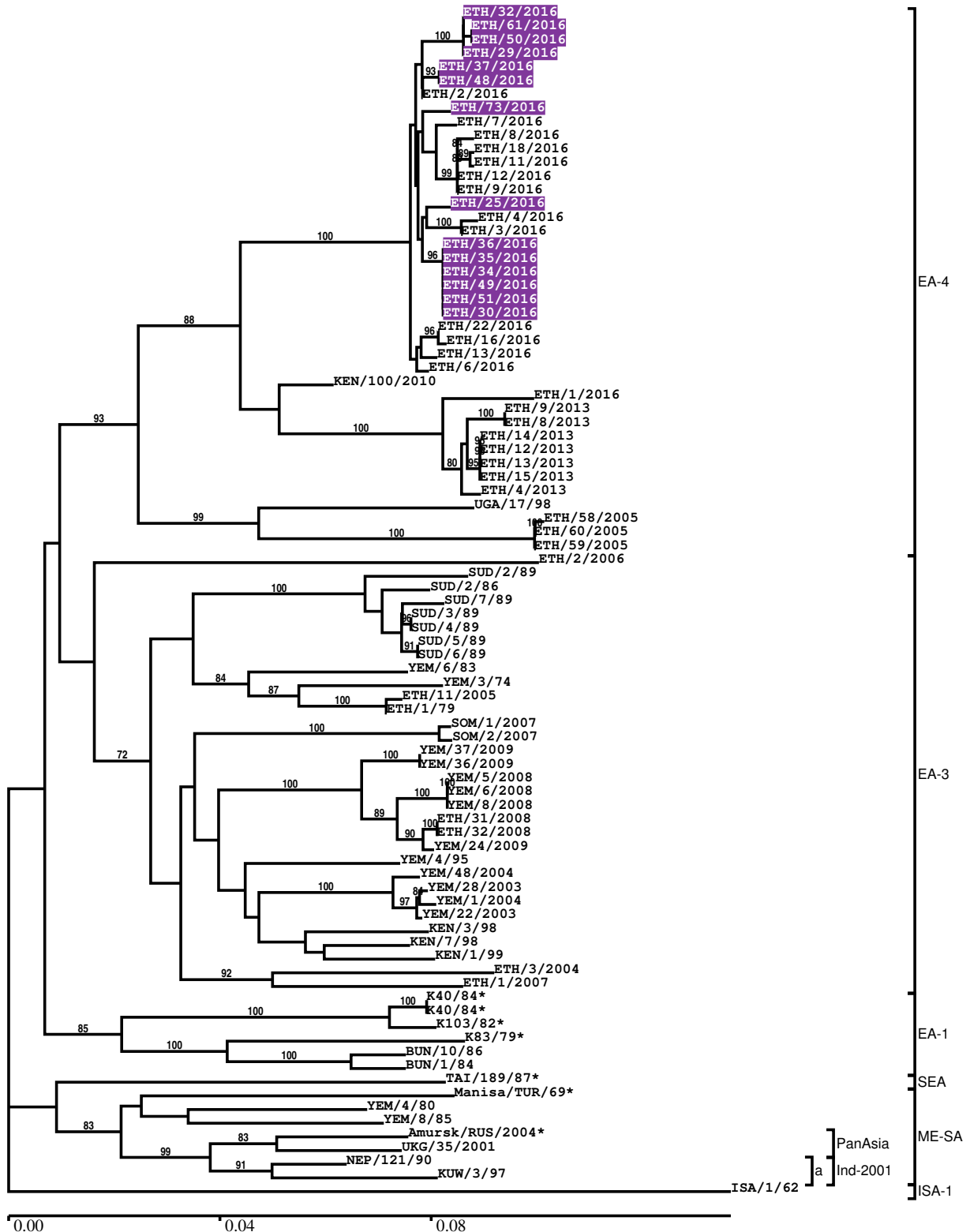
#### Most Closely Related Prototype Sequences

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		88.6	0	O	EA-4		
viba_621	ETH/58/2005	bovine	87.3	0	O	EA-4		
viba_116	SUD/2/86	bovine	86.9	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.8	0	O	EA-3		
viba_523	K83/79		85.7	0	O	EA-1		
viba_705	KUW/3/97	bovine	85.5	0	O	ME-SA	Ind-2001	a
viba_285	UKG/35/2001	porcine	85.5	0	O	ME-SA	PanAsia	
viba_62	ETH/2/2006	bovine	85.4	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.2	0	O	EA-3		
viba_359	Manisa/TUR/69		85.1	0	O	ME-SA		

Report on FMDV O in Ethiopia in 2016

Batch: WRLFMD/2017/00009



\*, not a WRLFMD Reference Number



## Analysis Parameters

VP1 subsequence extractor: vp1\_O  
 Query sequence set: WRLFMD/2017/00009-Ethiopia-O (14 sequences)  
 Sequence database set: allseqs\_O (3523 sequences)  
 Prototype sequence set: !prototypes\_O (47 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: 11  
 VIBASys version: master-1.1.0-17-gf69a4d1

## 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/32/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/61/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/50/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/29/2016	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/73/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/7/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/8/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/18/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/11/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/12/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/9/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/25/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/4/2016	n/a	cattle	WRLFMD	Ethiopia	EA-4
ETH/3/2016	n/a	cattle	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/34/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/49/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/51/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/30/2016	n/a	bovine	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
KEN/100/2010	KF135281	cattle	WRLFMD	Kenya	EA-4
ETH/1/2016	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/9/2013	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/8/2013	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/14/2013	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/12/2013	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/13/2013	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/15/2013	n/a	bovine	WRLFMD	Ethiopia	EA-4
ETH/4/2013	n/a	bovine	WRLFMD	Ethiopia	EA-4

*continued on next page*

label	accession	host(s)	lab	country	taxonomic information
UGA/17/98	HM211075	n/a	WRLFMD	Uganda	EA-4
ETH/58/2005	FJ798141	bovine	WRLFMD	Ethiopia	EA-4
ETH/60/2005	FJ798143	bovine	WRLFMD	Ethiopia	EA-4
ETH/59/2005	FJ798142	bovine	WRLFMD	Ethiopia	EA-4
ETH/2/2006	FJ798127	bovine	WRLFMD	Ethiopia	EA-3
SUD/2/89	GU566037	n/a	WRLFMD	Sudan	EA-3
SUD/2/86	DQ165075	bovine	WRLFMD	Sudan	EA-3
SUD/7/89	GU566042	n/a	WRLFMD	Sudan	EA-3
SUD/3/89	GU566038	n/a	WRLFMD	Sudan	EA-3
SUD/4/89	GU566039	n/a	WRLFMD	Sudan	EA-3
SUD/5/89	GU566040	n/a	WRLFMD	Sudan	EA-3
SUD/6/89	GU566041	n/a	WRLFMD	Sudan	EA-3
YEM/6/83	n/a	ovine	WRLFMD	Yemen	EA-3
YEM/3/74	n/a	cattle	WRLFMD	Yemen	EA-3
ETH/11/2005	FJ798107	bovine	WRLFMD	Ethiopia	EA-3
ETH/1/79	HM211077	cattle	WRLFMD	Ethiopia	EA-3
SOM/1/2007	n/a	cattle	WRLFMD	Somalia	EA-3
SOM/2/2007	n/a	cattle	WRLFMD	Somalia	EA-3
YEM/37/2009	n/a	cattle	WRLFMD	Yemen	EA-3
YEM/36/2009	n/a	cattle	WRLFMD	Yemen	EA-3
YEM/5/2008	n/a	cattle	WRLFMD	Yemen	EA-3
YEM/6/2008	n/a	cattle	WRLFMD	Yemen	EA-3
YEM/8/2008	n/a	cattle	WRLFMD	Yemen	EA-3
ETH/31/2008	n/a	cattle	WRLFMD	Ethiopia	EA-3
ETH/32/2008	n/a	cattle	WRLFMD	Ethiopia	EA-3
YEM/24/2009	n/a	cattle	WRLFMD	Yemen	EA-3
YEM/4/95	n/a	n/a	WRLFMD	Yemen	EA-3
YEM/48/2004	n/a	cattle	WRLFMD	Yemen	EA-3
YEM/28/2003	n/a	cattle	WRLFMD	Yemen	EA-3
YEM/1/2004	n/a	cattle	WRLFMD	Yemen	EA-3
YEM/22/2003	n/a	cattle	WRLFMD	Yemen	EA-3
KEN/3/98	n/a	bovine	WRLFMD	Kenya	EA-3
KEN/7/98	KF135266	bovine	WRLFMD	Kenya	EA-3
KEN/1/99	KF135267	bovine	WRLFMD	Kenya	EA-3
ETH/3/2004	FJ798109	cattle	WRLFMD	Ethiopia	EA-3
ETH/1/2007	FJ798137	cattle	WRLFMD	Ethiopia	EA-3
K40/84*	HM756592	bovine	Makerere University	Kenya	EA-1
K40/84*	KY091280	bovine	WRLFMD	Kenya	EA-1
K103/82*	HM756590	bovine	Makerere University	Kenya	EA-1
K83/79*	AJ303511	n/a	WRLFMD	Kenya	EA-1
BUN/10/86	n/a	n/a	WRLFMD	Burundi	EA-1
BUN/1/84	n/a	n/a	WRLFMD	Burundi	EA-1
TAI/189/87*	KY091288	bovine	TRRL	Thailand	SEA
Manisa/TUR/69*	AY593823	n/a	PIADC	Turkey	ME-SA
YEM/4/80	n/a	cattle	WRLFMD	Yemen	ME-SA
YEM/8/85	n/a	bovine	WRLFMD	Yemen	ME-SA
Amursk/RUS/2004*	n/a	n/a	ARRIAH	Russia	ME-SA/PanAsia
UKG/35/2001	AJ539141	porcine	PIADC	United Kingdom	ME-SA/PanAsia
NEP/121/90	DQ164930	n/a	WRLFMD	Nepal	ME-SA/Ind-2001/a
KUW/3/97	DQ164904	bovine	WRLFMD	Kuwait	ME-SA/Ind-2001/a
ISA/1/62	AJ303500	n/a	WRLFMD	Indonesia	ISA-1

\*, not a WRLFMD Reference Number

n/a, not available