

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

Genotyping Report

FMDV serotype: SAT2
Country: Sudan
Year: 2017
Batch: WRLFMD/2018/00020
No. of sequences: 5
Report date: 7th August 2018
Report generated by: Nick Knowles
Report checked by: Antonello Di Nardo



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

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Virus sample name:	SUD/6/2017
Sender reference:	4/2017
Location of origin:	Khartoum-Al Rdwan (No. 2)
Country of origin:	Sudan
Date of collection:	07/02/2017
Host species:	cattle
Serotype:	SAT2
Topotype:	VII
Lineage:	Alx-12
Sublineage:	
Sequence length:	642
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	26/07/2018
Primers:	SAT2-1C445F/SAT-2B208R; SAT2-P1-1223F/SAT-2B208R; FMD-3161F/FMD-4303R
Received for sequencing:	02/08/2018
Created:	04/08/2018
Last updated:	04/08/2018
VIBASys IDs: sample 37055, genome 37056, sequence viba_37057, sequencing info 37058	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_37060	SUD/7/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37064	SUD/9/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37068	SUD/12/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37072	SUD/14/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_35477	Daqahlia 1/Egy/2017		98.4	0	SAT2	VII	Alx-12	
viba_35485	Fayoum 1/Egy/2017		98.0	0	SAT2	VII	Alx-12	
viba_29827	SUD/7/2014	cattle	96.6	0	SAT2	VII	Alx-12	
viba_29815	SUD/5/2013	cattle	96.6	0	SAT2	VII	Alx-12	
viba_23610	EGY/24/2014	cattle	96.4	0	SAT2	VII	Alx-12	
viba_29819	SUD/9/2013	cattle	96.4	0	SAT2	VII	Alx-12	

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_424	SAU/6/2000	bovine	89.9	1	SAT2	VII		
viba_742	CAR/8/2005	cattle	85.7	0	SAT2	VII		
viba_470	KEN/2/84	bovine	74.9	0	SAT2	IX		
viba_369	UGA/51/75	bovine	74.2	0	SAT2	XII		
viba_127	KEN/3/57		74.1	0	SAT2	IX		
viba_456	ZAI/1/82	bovine	73.9	1	SAT2	X		
viba_189	RWA/1/2000		72.9	0	SAT2	VIII		
viba_756	UGA/19/98		72.8	0	SAT2	X		
viba_248	KEN/1/84	bovine	72.6	0	SAT2	IV		
viba_193	SUD/6/77		72.3	0	SAT2	XIII		

Virus sample name:	SUD/7/2017
Sender reference:	5/2017
Location of origin:	Khartoum-Al Rdwan (No. 3)
Country of origin:	Sudan
Date of collection:	07/02/2017
Host species:	cattle
Serotype:	SAT2
Topotype:	VII
Lineage:	Alx-12
Sublineage:	
Sequence length:	642
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	25/07/2018
Primers:	SAT2-1C445F/SAT-2B208R; SAT2-P1-1223F/SAT-2B208R; FMD-3161F/FMD-4303R
Received for sequencing:	02/08/2018
Created:	04/08/2018
Last updated:	07/08/2018
VIBASys IDs: sample 37047, genome 37059, sequence viba_37060, sequencing info 37061	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_37064	SUD/9/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37068	SUD/12/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37072	SUD/14/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37057	SUD/6/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_35477	Daqahlia 1/Egy/2017		98.4	0	SAT2	VII	Alx-12	
viba_35485	Fayoum 1/Egy/2017		98.0	0	SAT2	VII	Alx-12	
viba_29827	SUD/7/2014	cattle	96.6	0	SAT2	VII	Alx-12	
viba_29815	SUD/5/2013	cattle	96.6	0	SAT2	VII	Alx-12	
viba_23610	EGY/24/2014	cattle	96.4	0	SAT2	VII	Alx-12	
viba_29819	SUD/9/2013	cattle	96.4	0	SAT2	VII	Alx-12	

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_424	SAU/6/2000	bovine	89.9	1	SAT2	VII		
viba_742	CAR/8/2005	cattle	85.7	0	SAT2	VII		
viba_470	KEN/2/84	bovine	74.9	0	SAT2	IX		
viba_369	UGA/51/75	bovine	74.2	0	SAT2	XII		
viba_127	KEN/3/57		74.1	0	SAT2	IX		
viba_456	ZAI/1/82	bovine	73.9	1	SAT2	X		
viba_189	RWA/1/2000		72.9	0	SAT2	VIII		
viba_756	UGA/19/98		72.8	0	SAT2	X		
viba_248	KEN/1/84	bovine	72.6	0	SAT2	IV		
viba_193	SUD/6/77		72.3	0	SAT2	XIII		

Virus sample name:	SUD/9/2017
Sender reference:	7/2017
Location of origin:	Khartoum-Al Rdwan (No. 4)
Country of origin:	Sudan
Date of collection:	21/02/2017
Host species:	cattle
Serotype:	SAT2
Topotype:	VII
Lineage:	Alx-12
Sublineage:	
Sequence length:	642
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	26/07/2018
Primers:	SAT2-1C445F/SAT-2B208R; SAT2-P1-1223F/SAT-2B208R; FMD-3161F/FMD-4303R
Received for sequencing:	02/08/2018
Created:	04/08/2018
Last updated:	07/08/2018
VIBASys IDs: sample 37062, genome 37063, sequence viba_37064, sequencing info 37065	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_37060	SUD/7/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37068	SUD/12/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37072	SUD/14/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37057	SUD/6/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_35477	Daqahlia 1/Egy/2017		98.4	0	SAT2	VII	Alx-12	
viba_35485	Fayoum 1/Egy/2017		98.0	0	SAT2	VII	Alx-12	
viba_29827	SUD/7/2014	cattle	96.6	0	SAT2	VII	Alx-12	
viba_29815	SUD/5/2013	cattle	96.6	0	SAT2	VII	Alx-12	
viba_23610	EGY/24/2014	cattle	96.4	0	SAT2	VII	Alx-12	
viba_29819	SUD/9/2013	cattle	96.4	0	SAT2	VII	Alx-12	

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_424	SAU/6/2000	bovine	89.9	1	SAT2	VII		
viba_742	CAR/8/2005	cattle	85.7	0	SAT2	VII		
viba_470	KEN/2/84	bovine	74.9	0	SAT2	IX		
viba_369	UGA/51/75	bovine	74.2	0	SAT2	XII		
viba_127	KEN/3/57		74.1	0	SAT2	IX		
viba_456	ZAI/1/82	bovine	73.9	1	SAT2	X		
viba_189	RWA/1/2000		72.9	0	SAT2	VIII		
viba_756	UGA/19/98		72.8	0	SAT2	X		
viba_248	KEN/1/84	bovine	72.6	0	SAT2	IV		
viba_193	SUD/6/77		72.3	0	SAT2	XIII		

Virus sample name:	SUD/12/2017
Sender reference:	14/2017
Location of origin:	Khartoum-Al Rdwan (No. 2)
Country of origin:	Sudan
Date of collection:	21/02/2017
Host species:	cattle
Serotype:	SAT2
Topotype:	VII
Lineage:	Alx-12
Sublineage:	
Sequence length:	642
Ambiguities:	0
Material submitted for sequencing:	BTy2
Harvest date of material:	27/07/2018
Primers:	SAT2-1C445F/SAT-2B208R; SAT2-P1-1223F/SAT-2B208R; FMD-3161F/FMD-4303R
Received for sequencing:	02/08/2018
Created:	04/08/2018
Last updated:	07/08/2018
VIBASys IDs: sample 37066, genome 37067, sequence viba_37068, sequencing info 37069	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_37060	SUD/7/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37064	SUD/9/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37072	SUD/14/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37057	SUD/6/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_35477	Daqahlia 1/Egy/2017		98.4	0	SAT2	VII	Alx-12	
viba_35485	Fayoum 1/Egy/2017		98.0	0	SAT2	VII	Alx-12	
viba_29827	SUD/7/2014	cattle	96.6	0	SAT2	VII	Alx-12	
viba_29815	SUD/5/2013	cattle	96.6	0	SAT2	VII	Alx-12	
viba_23610	EGY/24/2014	cattle	96.4	0	SAT2	VII	Alx-12	
viba_29819	SUD/9/2013	cattle	96.4	0	SAT2	VII	Alx-12	

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_424	SAU/6/2000	bovine	89.9	1	SAT2	VII		
viba_742	CAR/8/2005	cattle	85.7	0	SAT2	VII		
viba_470	KEN/2/84	bovine	74.9	0	SAT2	IX		
viba_369	UGA/51/75	bovine	74.2	0	SAT2	XII		
viba_127	KEN/3/57		74.1	0	SAT2	IX		
viba_456	ZAI/1/82	bovine	73.9	1	SAT2	X		
viba_189	RWA/1/2000		72.9	0	SAT2	VIII		
viba_756	UGA/19/98		72.8	0	SAT2	X		
viba_248	KEN/1/84	bovine	72.6	0	SAT2	IV		
viba_193	SUD/6/77		72.3	0	SAT2	XIII		

Virus sample name:	SUD/14/2017
Sender reference:	8/2017
Location of origin:	Khartoum-Al Aelfon (No. 1)
Country of origin:	Sudan
Date of collection:	04/06/2017
Host species:	cattle
Serotype:	SAT2
Topotype:	VII
Lineage:	Alx-12
Sublineage:	
Sequence length:	642
Ambiguities:	0
Material submitted for sequencing:	BTy1
Harvest date of material:	26/07/2018
Primers:	SAT2-1C445F/SAT-2B208R; SAT2-P1-1223F/SAT-2B208R; FMD-3161F/FMD-4303R
Received for sequencing:	02/08/2018
Created:	04/08/2018
Last updated:	04/08/2018
VIBASys IDs: sample 37070, genome 37071, sequence viba_37072, sequencing info 37073	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_37060	SUD/7/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37064	SUD/9/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37068	SUD/12/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_37057	SUD/6/2017	cattle	100.0	0	SAT2	VII	Alx-12	
viba_35477	Daqahlia 1/Egy/2017		98.4	0	SAT2	VII	Alx-12	
viba_35485	Fayoum 1/Egy/2017		98.0	0	SAT2	VII	Alx-12	
viba_29827	SUD/7/2014	cattle	96.6	0	SAT2	VII	Alx-12	
viba_29815	SUD/5/2013	cattle	96.6	0	SAT2	VII	Alx-12	
viba_23610	EGY/24/2014	cattle	96.4	0	SAT2	VII	Alx-12	
viba_29819	SUD/9/2013	cattle	96.4	0	SAT2	VII	Alx-12	

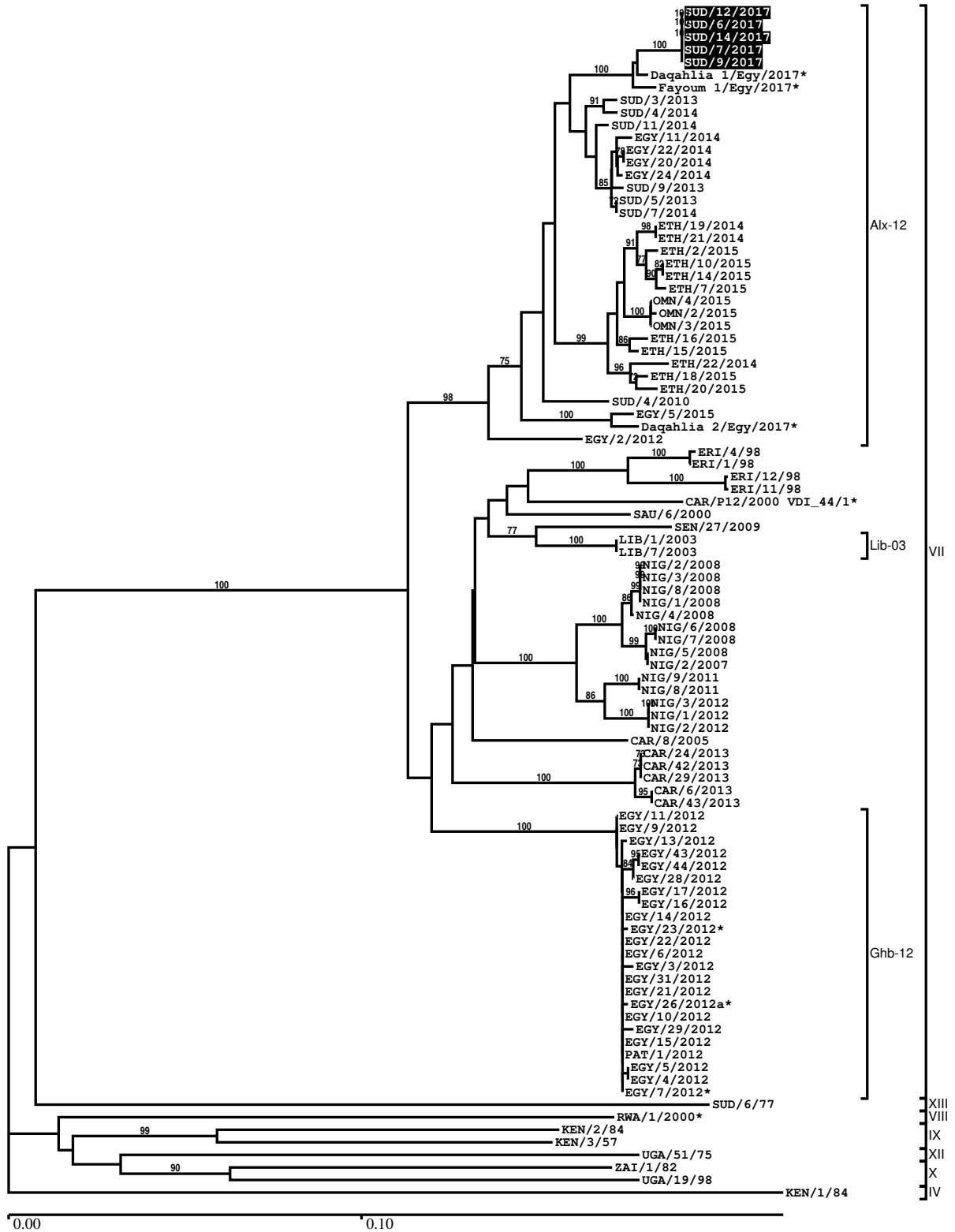
Most Closely Related Prototype Sequences

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

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_424	SAU/6/2000	bovine	89.9	1	SAT2	VII		
viba_742	CAR/8/2005	cattle	85.7	0	SAT2	VII		
viba_470	KEN/2/84	bovine	74.9	0	SAT2	IX		
viba_369	UGA/51/75	bovine	74.2	0	SAT2	XII		
viba_127	KEN/3/57		74.1	0	SAT2	IX		
viba_456	ZAI/1/82	bovine	73.9	1	SAT2	X		
viba_189	RWA/1/2000		72.9	0	SAT2	VIII		
viba_756	UGA/19/98		72.8	0	SAT2	X		
viba_248	KEN/1/84	bovine	72.6	0	SAT2	IV		
viba_193	SUD/6/77		72.3	0	SAT2	XIII		

Report on FMDV SAT2 in Sudan in 2017

Batch: WRLFMD/2018/00020



*, not a WRLFMD Reference Number

Analysis Parameters

VP1 subsequence extractor:	vp1_SAT2
Query sequence set:	WRLFMD/2018/00020-Sudan-SAT2 (5 sequences)
Sequence database set:	allseqs_SAT2 (861 sequences)
Prototype sequence set:	!prototypes_SAT2 (25 sequences)
Number of related sequences reported:	10
Minimal VP1 subsequence match length	600
Sequence alignment method:	muscle (default parameters)
Sequence alignment length:	642
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/SAT2

label	accession	host(s)	lab	country	taxonomic information
SUD/12/2017	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
SUD/6/2017	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
SUD/14/2017	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
SUD/7/2017	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
SUD/9/2017	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
Daqahlia 1/Egy/2017*	MF322694	n/a	MEVAC	Egypt	VII/Alx-12
Fayoum 1/Egy/2017*	MF322696	n/a	MEVAC	Egypt	VII/Alx-12
SUD/3/2013	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
SUD/4/2014	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
SUD/11/2014	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
EGY/11/2014	KX258064	cattle	WRLFMD	Egypt	VII/Alx-12
EGY/22/2014	KX258066	cattle	WRLFMD	Egypt	VII/Alx-12
EGY/20/2014	KX258065	cattle	WRLFMD	Egypt	VII/Alx-12
EGY/24/2014	KX258067	cattle	WRLFMD	Egypt	VII/Alx-12
SUD/9/2013	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
SUD/5/2013	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
SUD/7/2014	n/a	cattle	WRLFMD	Sudan	VII/Alx-12
ETH/19/2014	KX258068	bovine	WRLFMD	Ethiopia	VII/Alx-12
ETH/21/2014	KX258069	bovine	WRLFMD	Ethiopia	VII/Alx-12
ETH/2/2015	KX258071	cattle	WRLFMD	Ethiopia	VII/Alx-12
ETH/10/2015	n/a	caprine	WRLFMD	Ethiopia	VII/Alx-12
ETH/14/2015	n/a	bovine	WRLFMD	Ethiopia	VII/Alx-12
ETH/7/2015	n/a	bovine	WRLFMD	Ethiopia	VII/Alx-12
OMN/4/2015	n/a	cattle	WRLFMD	Oman	VII/Alx-12
OMN/2/2015	n/a	cattle	WRLFMD	Oman	VII/Alx-12
OMN/3/2015	n/a	cattle	WRLFMD	Oman	VII/Alx-12
ETH/16/2015	n/a	bovine	WRLFMD	Ethiopia	VII/Alx-12
ETH/15/2015	n/a	bovine	WRLFMD	Ethiopia	VII/Alx-12
ETH/22/2014	KX258070	bovine	WRLFMD	Ethiopia	VII/Alx-12
ETH/18/2015	n/a	bovine	WRLFMD	Ethiopia	VII/Alx-12
ETH/20/2015	n/a	bovine	WRLFMD	Ethiopia	VII/Alx-12
SUD/4/2010	KF112968	cattle	WRLFMD	Sudan	VII/Alx-12
EGY/5/2015	n/a	cattle	WRLFMD	Egypt	VII/Alx-12
Daqahlia 2/Egy/2017*	MF322695	n/a	MEVAC	Egypt	VII/Alx-12
EGY/2/2012	JX570617	n/a	WRLFMD	Egypt	VII/Alx-12
ERI/4/98	AY343934	n/a	OVI	Eritrea	VII

continued on next page

label	accession	host(s)	lab	country	taxonomic information
ERI/1/98	AY343933	n/a	OVI	Eritrea	VII
ERI/12/98	AF367126	n/a	OVI	Eritrea	VII
ERI/11/98	n/a	bovine	WRLFMD	Eritrea	VII
CAR/P12/2000 VDI_44/1*	HM211082	n/a	WRLFMD	Cameroon	VII
SAU/6/2000	AF367135	bovine	OVI	Saudi Arabia	VII
SEN/27/2009	KF112967	cattle	WRLFMD	Senegal	VII
LIB/1/2003	JX570631	n/a	WRLFMD	Libya	VII/Lib-03
LIB/7/2003	JX570632	n/a	WRLFMD	Libya	VII/Lib-03
NIG/2/2008	KX258077	cattle	WRLFMD	Nigeria	VII
NIG/3/2008	KX258078	cattle	WRLFMD	Nigeria	VII
NIG/8/2008	KX258083	cattle	WRLFMD	Nigeria	VII
NIG/1/2008	KX258076	cattle	WRLFMD	Nigeria	VII
NIG/4/2008	KX258079	cattle	WRLFMD	Nigeria	VII
NIG/6/2008	KX258081	cattle	WRLFMD	Nigeria	VII
NIG/7/2008	KX258082	cattle	WRLFMD	Nigeria	VII
NIG/5/2008	KX258080	cattle	WRLFMD	Nigeria	VII
NIG/2/2007	JX570636	cattle	WRLFMD	Nigeria	VII
NIG/9/2011	KX258088	bovine	WRLFMD	Nigeria	VII
NIG/8/2011	KX258087	bovine	WRLFMD	Nigeria	VII
NIG/3/2012	KX258096	bovine	WRLFMD	Nigeria	VII
NIG/1/2012	KX258094	bovine	WRLFMD	Nigeria	VII
NIG/2/2012	KX258095	bovine	WRLFMD	Nigeria	VII
CAR/8/2005	JX570616	cattle	WRLFMD	Cameroon	VII
CAR/24/2013	n/a	cattle	WRLFMD	Cameroon	VII
CAR/42/2013	n/a	cattle	WRLFMD	Cameroon	VII
CAR/29/2013	n/a	cattle	WRLFMD	Cameroon	VII
CAR/6/2013	n/a	cattle	WRLFMD	Cameroon	VII
CAR/43/2013	n/a	cattle	WRLFMD	Cameroon	VII
EGY/11/2012	JX570624	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/9/2012	JX570622	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/13/2012	JX570625	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/43/2012	KX258063	cattle	WRLFMD	Egypt	VII/Ghb-12
EGY/44/2012	n/a	cattle	WRLFMD	Egypt	VII/Ghb-12
EGY/28/2012	KF112935	cattle	WRLFMD	Egypt	VII/Ghb-12
EGY/17/2012	KF112932	water buffalo	WRLFMD	Egypt	VII/Ghb-12
EGY/16/2012	KF112931	water buffalo	WRLFMD	Egypt	VII/Ghb-12
EGY/14/2012	JX570626	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/23/2012*	JX013980	cattle	n/a	Egypt	VII/Ghb-12
EGY/22/2012	KF112934	cattle	WRLFMD	Egypt	VII/Ghb-12
EGY/6/2012	JX570621	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/3/2012	JX570618	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/31/2012	KF112937	cattle	WRLFMD	Egypt	VII/Ghb-12
EGY/21/2012	KF112933	cattle	WRLFMD	Egypt	VII/Ghb-12
EGY/26/2012a*	JX013979	water buffalo	n/a	Egypt	VII/Ghb-12
EGY/10/2012	JX570623	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/29/2012	KF112936	cattle	WRLFMD	Egypt	VII/Ghb-12
EGY/15/2012	JX570627	n/a	WRLFMD	Egypt	VII/Ghb-12
PAT/1/2012	JX570637	cattle	WRLFMD	Palestinian AT	VII/Ghb-12
EGY/5/2012	JX570620	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/4/2012	JX570619	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/7/2012*	JX013978	water buffalo	n/a	Egypt	VII/Ghb-12
SUD/6/77	AY343939	n/a	OVI	Sudan	XIII
RWA/1/2000*	AF367134	n/a	OVI	Rwanda	VIII
KEN/2/84	AY343941	bovine	OVI	Kenya	IX
KEN/3/57	AJ251473	n/a	WRLFMD	Kenya	IX
UGA/51/75	AY343963	bovine	OVI	Uganda	XII
ZAI/1/82	AF367100	bovine	OVI	Zaire	X
UGA/19/98	AY343969	n/a	OVI	Uganda	X
KEN/1/84	AY344505	bovine	OVI	Kenya	IV

*, not a WRLFMD Reference Number

n/a, not available