

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

## Genotyping Report

FMDV serotype: O  
Country: Uganda  
Year: 2022  
Batch: WRLFMD/2023/000016  
No. of sequences: 4  
Report date: 20th April 2023  
Report generated by: Nick Knowles  
Report checked by: Jemma Wadsworth



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Virus sample name:	UGA/17/2022
Sender reference:	D2256/3
Location of origin:	Nabilatuk, Northern Region
Country of origin:	Uganda
Date of collection:	20/11/2022
Host species:	cattle
Serotype:	O
Topotype:	EA-2
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	WRL-LFBK1
Harvest date of material:	24/03/2023
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	17/04/2023
Created:	20/04/2023
Last updated:	20/04/2023

VIBASys IDs: sample 52859, genome 52860, sequence viba\_52861, sequencing info 52862

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_52869	UGA/26/2022	cattle	100.0	0	O	EA-2		
viba_52865	UGA/24/2022	cattle	100.0	0	O	EA-2		
viba_52873	UGA/27/2022	cattle	99.8	0	O	EA-2		
viba_48671	COD/19/2021	cattle	97.6	0	O	EA-2		
viba_48663	COD/6/2021	cattle	97.6	0	O	EA-2		
viba_48667	COD/12/2021	cattle	97.6	0	O	EA-2		
viba_48675	COD/28/2021	cattle	97.6	0	O	EA-2		
viba_49035	UGA/25/2020	cattle	97.6	0	O	EA-2		
viba_48683	COD/37/2021	cattle	97.5	0	O	EA-2		
viba_48699	COD/49/2021	cattle	97.5	0	O	EA-2		

#### 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_263	TAN/2/2004	bovine	91.5	0	O	EA-2		
viba_85	UGA/3/2002		88.0	0	O	EA-2		
viba_74	KEN/5/2002	bovine	87.7	0	O	EA-2		
viba_221	MAL/1/98		86.7	0	O	EA-2		
viba_35331	SRL/1/78		84.9	0	O	WCSA-1	Srl-77	
viba_27877	SRL/2/97	bovine	83.6	0	O	ME-SA	Srl-97	
viba_38646	SYR/18/62		83.5	0	O	WCSA-1	Syr-62	
viba_523	K83/79		83.3	0	O	EA-1		
viba_705	KUW/3/97	bovine	82.9	0	O	ME-SA	Ind-2001	a
viba_359	Manisa/TUR/69		82.9	0	O	ME-SA		

Virus sample name:	UGA/24/2022
Sender reference:	D22556/5
Location of origin:	Lyantonde, Central Region
Country of origin:	Uganda
Date of collection:	29/11/2022
Host species:	cattle
Serotype:	O
Topotype:	EA-2
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	WRL-LFBK1
Harvest date of material:	26/03/2023
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	17/04/2023
Created:	20/04/2023
Last updated:	20/04/2023
VIBASys IDs: sample 52863, genome 52864, sequence viba_52865, sequencing info 52866	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_52869	UGA/26/2022	cattle	100.0	0	O	EA-2		
viba_52861	UGA/17/2022	cattle	100.0	0	O	EA-2		
viba_52873	UGA/27/2022	cattle	99.8	0	O	EA-2		
viba_48671	COD/19/2021	cattle	97.6	0	O	EA-2		
viba_48663	COD/6/2021	cattle	97.6	0	O	EA-2		
viba_48667	COD/12/2021	cattle	97.6	0	O	EA-2		
viba_48675	COD/28/2021	cattle	97.6	0	O	EA-2		
viba_49035	UGA/25/2020	cattle	97.6	0	O	EA-2		
viba_48683	COD/37/2021	cattle	97.5	0	O	EA-2		
viba_48699	COD/49/2021	cattle	97.5	0	O	EA-2		

#### 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_263	TAN/2/2004	bovine	91.5	0	O	EA-2		
viba_85	UGA/3/2002		88.0	0	O	EA-2		
viba_74	KEN/5/2002	bovine	87.7	0	O	EA-2		
viba_221	MAL/1/98		86.7	0	O	EA-2		
viba_35331	SRL/1/78		84.9	0	O	WCSA-1	Srl-77	
viba_27877	SRL/2/97	bovine	83.6	0	O	ME-SA	Srl-97	
viba_38646	SYR/18/62		83.5	0	O	WCSA-1	Syr-62	
viba_523	K83/79		83.3	0	O	EA-1		
viba_705	KUW/3/97	bovine	82.9	0	O	ME-SA	Ind-2001	a
viba_359	Manisa/TUR/69		82.9	0	O	ME-SA		

Virus sample name:	UGA/26/2022
Sender reference:	D22556/9
Location of origin:	Lyantonde, Central Region
Country of origin:	Uganda
Date of collection:	29/11/2022
Host species:	cattle
Serotype:	O
Topotype:	EA-2
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	WRL-LFBK1
Harvest date of material:	26/03/2023
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	17/04/2023
Created:	20/04/2023
Last updated:	20/04/2023
VIBASys IDs: sample 52867, genome 52868, sequence viba_52869, sequencing info 52870	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_52861	UGA/17/2022	cattle	100.0	0	O	EA-2		
viba_52865	UGA/24/2022	cattle	100.0	0	O	EA-2		
viba_52873	UGA/27/2022	cattle	99.8	0	O	EA-2		
viba_48671	COD/19/2021	cattle	97.6	0	O	EA-2		
viba_48663	COD/6/2021	cattle	97.6	0	O	EA-2		
viba_48667	COD/12/2021	cattle	97.6	0	O	EA-2		
viba_48675	COD/28/2021	cattle	97.6	0	O	EA-2		
viba_49035	UGA/25/2020	cattle	97.6	0	O	EA-2		
viba_48683	COD/37/2021	cattle	97.5	0	O	EA-2		
viba_48699	COD/49/2021	cattle	97.5	0	O	EA-2		

#### 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_263	TAN/2/2004	bovine	91.5	0	O	EA-2		
viba_85	UGA/3/2002		88.0	0	O	EA-2		
viba_74	KEN/5/2002	bovine	87.7	0	O	EA-2		
viba_221	MAL/1/98		86.7	0	O	EA-2		
viba_35331	SRL/1/78		84.9	0	O	WCSA-1	Srl-77	
viba_27877	SRL/2/97	bovine	83.6	0	O	ME-SA	Srl-97	
viba_38646	SYR/18/62		83.5	0	O	WCSA-1	Syr-62	
viba_523	K83/79		83.3	0	O	EA-1		
viba_705	KUW/3/97	bovine	82.9	0	O	ME-SA	Ind-2001	a
viba_359	Manisa/TUR/69		82.9	0	O	ME-SA		

Virus sample name:	UGA/27/2022
Sender reference:	D22556/10
Location of origin:	Lyantonde, Central Region
Country of origin:	Uganda
Date of collection:	29/11/2022
Host species:	cattle
Serotype:	O
Topotype:	EA-2
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	WRL-LFBK1
Harvest date of material:	26/03/2023
Primers:	O-1C244F/EUR-2B52R; FMD-3161F/FMD-4303R
Received for sequencing:	17/04/2023
Created:	20/04/2023
Last updated:	20/04/2023
VIBASys IDs: sample 52871, genome 52872, sequence viba_52873, sequencing info 52874	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_52869	UGA/26/2022	cattle	99.8	0	O	EA-2		
viba_52861	UGA/17/2022	cattle	99.8	0	O	EA-2		
viba_52865	UGA/24/2022	cattle	99.8	0	O	EA-2		
viba_48671	COD/19/2021	cattle	97.5	0	O	EA-2		
viba_48663	COD/6/2021	cattle	97.5	0	O	EA-2		
viba_48667	COD/12/2021	cattle	97.5	0	O	EA-2		
viba_48675	COD/28/2021	cattle	97.5	0	O	EA-2		
viba_49035	UGA/25/2020	cattle	97.5	0	O	EA-2		
viba_48683	COD/37/2021	cattle	97.3	0	O	EA-2		
viba_48699	COD/49/2021	cattle	97.3	0	O	EA-2		

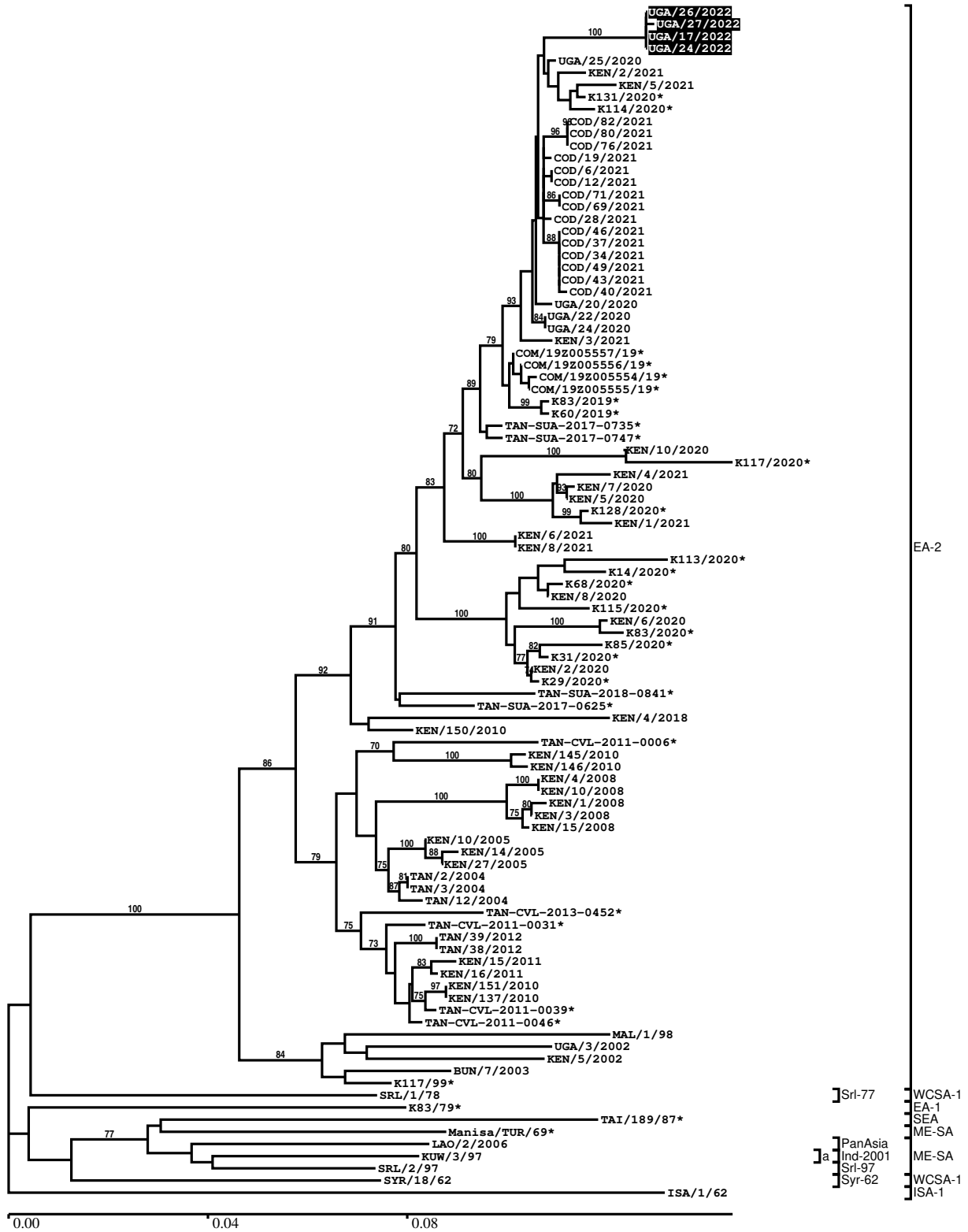
#### Most Closely Related Prototype Sequences

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

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_263	TAN/2/2004	bovine	91.3	0	O	EA-2		
viba_85	UGA/3/2002		88.0	0	O	EA-2		
viba_74	KEN/5/2002	bovine	87.7	0	O	EA-2		
viba_221	MAL/1/98		86.7	0	O	EA-2		
viba_35331	SRL/1/78		84.7	0	O	WCSA-1	Srl-77	
viba_27877	SRL/2/97	bovine	83.6	0	O	ME-SA	Srl-97	
viba_38646	SYR/18/62		83.5	0	O	WCSA-1	Syr-62	
viba_523	K83/79		83.1	0	O	EA-1		
viba_9021	LAO/2/2006	cattle	83.0	0	O	ME-SA	PanAsia	
viba_705	KUW/3/97	bovine	82.9	0	O	ME-SA	Ind-2001	a

Report on FMDV O in Uganda in 2022

Batch: WRLFMD/2023/000016



\*, not a WRLFMD Reference Number

## Analysis Parameters

VP1 subsequence extractor:	vp1_O
Query sequence set:	WRLFMD/2023/000016-Uganda-O (4 sequences)
Sequence database set:	allseqs_O (5880 sequences)
Prototype sequence set:	!prototypes_O (58 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:	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
UGA/26/2022	n/a	cattle	WRLFMD	Uganda	EA-2
UGA/27/2022	n/a	cattle	WRLFMD	Uganda	EA-2
UGA/17/2022	n/a	cattle	WRLFMD	Uganda	EA-2
UGA/24/2022	n/a	cattle	WRLFMD	Uganda	EA-2
UGA/25/2020	n/a	cattle	WRLFMD	Uganda	EA-2
KEN/2/2021	n/a	cattle	WRLFMD	Kenya	EA-2
KEN/5/2021	n/a	cattle	WRLFMD	Kenya	EA-2
K131/2020*	OP184912	bovine	EMBAKASI	Kenya	EA-2
K114/2020*	OP184913	bovine	EMBAKASI	Kenya	EA-2
COD/82/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/80/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/76/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/19/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/6/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/12/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/71/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/69/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/28/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2

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label	accession	host(s)	lab	country	taxonomic information
COD/46/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/37/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/34/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/49/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/43/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/40/2021	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
UGA/20/2020	n/a	cattle	WRLFMD	Uganda	EA-2
UGA/22/2020	n/a	cattle	WRLFMD	Uganda	EA-2
UGA/24/2020	n/a	cattle	WRLFMD	Uganda	EA-2
KEN/3/2021	n/a	cattle	WRLFMD	Kenya	EA-2
COM/19Z005557/19*	n/a	cattle	ANSES	Comoros	EA-2
COM/19Z005556/19*	n/a	cattle	ANSES	Comoros	EA-2
COM/19Z005554/19*	n/a	cattle	ANSES	Comoros	EA-2
COM/19Z005555/19*	n/a	cattle	ANSES	Comoros	EA-2
K83/2019*	OP184915	bovine	EMBAKASI	Kenya	EA-2
K60/2019*	OP184914	bovine	EMBAKASI	Kenya	EA-2
TAN-SUA-2017-0735*	n/a	cattle	SUA	Tanzania	EA-2
TAN-SUA-2017-0747*	n/a	cattle	SUA	Tanzania	EA-2
KEN/10/2020	n/a	cattle	WRLFMD	Kenya	EA-2
K117/2020*	OP184911	bovine	EMBAKASI	Kenya	EA-2
KEN/4/2021	n/a	cattle	WRLFMD	Kenya	EA-2
KEN/7/2020	n/a	cattle	WRLFMD	Kenya	EA-2
KEN/5/2020	n/a	cattle	WRLFMD	Kenya	EA-2
K128/2020*	OP184910	bovine	EMBAKASI	Kenya	EA-2
KEN/1/2021	n/a	cattle	WRLFMD	Kenya	EA-2
KEN/6/2021	n/a	cattle	WRLFMD	Kenya	EA-2
KEN/8/2021	n/a	cattle	WRLFMD	Kenya	EA-2
K113/2020*	OP184905	bovine	EMBAKASI	Kenya	EA-2
K14/2020*	OP184908	bovine	EMBAKASI	Kenya	EA-2
K68/2020*	OP184909	bovine	EMBAKASI	Kenya	EA-2
KEN/8/2020	n/a	cattle	WRLFMD	Kenya	EA-2
K115/2020*	OP184902	bovine	EMBAKASI	Kenya	EA-2
KEN/6/2020	n/a	cattle	WRLFMD	Kenya	EA-2
K83/2020*	OP184904	bovine	EMBAKASI	Kenya	EA-2
K85/2020*	OP184907	bovine	EMBAKASI	Kenya	EA-2
K31/2020*	OP184906	bovine	EMBAKASI	Kenya	EA-2
KEN/2/2020	n/a	cattle	WRLFMD	Kenya	EA-2
K29/2020*	OP184903	bovine	EMBAKASI	Kenya	EA-2
TAN-SUA-2018-0841*	n/a	porcine	SUA	Tanzania	EA-2
TAN-SUA-2017-0625*	n/a	cattle	SUA	Tanzania	EA-2
KEN/4/2018	n/a	bovine	WRLFMD	Kenya	EA-2
KEN/150/2010	KF135286	cattle	WRLFMD	Kenya	EA-2
TAN-CVL-2011-0006*	n/a	bovine	CVL	Tanzania	EA-2
KEN/145/2010	KF135283	cattle	WRLFMD	Kenya	EA-2
KEN/146/2010	KF135284	cattle	WRLFMD	Kenya	EA-2
KEN/4/2008	KF135277	cattle	WRLFMD	Kenya	EA-2
KEN/10/2008	n/a	cattle	WRLFMD	Kenya	EA-2
KEN/1/2008	n/a	cattle	WRLFMD	Kenya	EA-2
KEN/3/2008	KF135276	cattle	WRLFMD	Kenya	EA-2
KEN/15/2008	n/a	cattle	WRLFMD	Kenya	EA-2
KEN/10/2005	n/a	cattle	WRLFMD	Kenya	EA-2
KEN/14/2005	KF135273	cattle	WRLFMD	Kenya	EA-2
KEN/27/2005	KF135274	cattle	WRLFMD	Kenya	EA-2
TAN/2/2004	KF561679	bovine	WRLFMD	Tanzania	EA-2
TAN/3/2004	KF561680	bovine	WRLFMD	Tanzania	EA-2

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label	accession	host(s)	lab	country	taxonomic information
TAN/12/2004	KF561681	bovine	WRLFMD	Tanzania	EA-2
TAN-CVL-2013-0452*	n/a	cattle	CVL, Tanzania	Tanzania	EA-2
TAN-CVL-2011-0031*	n/a	cattle	CVL, Tanzania	Tanzania	EA-2
TAN/39/2012	MF592624	cattle	WRLFMD	Tanzania	EA-2
TAN/38/2012	MF592623	cattle	WRLFMD	Tanzania	EA-2
KEN/15/2011	KF135292	cattle	WRLFMD	Kenya	EA-2
KEN/16/2011	KF135293	cattle	WRLFMD	Kenya	EA-2
KEN/151/2010	KF135287	cattle	WRLFMD	Kenya	EA-2
KEN/137/2010	KF135282	cattle	WRLFMD	Kenya	EA-2
TAN-CVL-2011-0039*	n/a	bovine	CVL	Tanzania	EA-2
TAN-CVL-2011-0046*	n/a	bovine	CVL	Tanzania	EA-2
MAL/1/98	DQ165074	n/a	WRLFMD	Malawi	EA-2
UGA/3/2002	DQ165077	n/a	WRLFMD	Uganda	EA-2
KEN/5/2002	DQ165073	bovine	WRLFMD	Kenya	EA-2
BUN/7/2003	n/a	n/a	WRLFMD	Burundi	EA-2
K117/99*	HM625676	bovine	Makerere University	Kenya	EA-2
SRL/1/78	HM756603	n/a	WRLFMD	Sri Lanka	WCSA-1/Srl-77
K83/79*	AJ303511	n/a	WRLFMD	Kenya	EA-1
TAI/189/87*	KY091288	bovine	TRRL	Thailand	SEA
Manisa/TUR/69*	AY593823	n/a	PIADC	Turkey	ME-SA
LAO/2/2006	EU667451	cattle	WRLFMD	Laos	ME-SA/PanAsia
KUW/3/97	DQ164904	bovine	WRLFMD	Kuwait	ME-SA/Ind-2001/a
SRL/2/97	AJ303531	bovine	WRLFMD	Sri Lanka	ME-SA/Srl-97
SYR/18/62	MK390935	n/a	WRLFMD	Syria	WCSA-1/Syr-62
ISA/1/62	AJ303500	n/a	WRLFMD	Indonesia	ISA-1

\*, not a WRLFMD Reference Number

n/a, not available