

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

Genotyping Report

FMDV serotype: O
Country: Ghana
Year: 2019
Batch: WRLMEG/2019/00023
No. of sequences: 4
Report date: 26th March 2019
Report generated by: Nick Knowles
Report checked by: Jemma Wadsworth



Copyright © 2019 The Pirbright Institute, Ash Road, Pirbright, Woking GU24 0NF, United Kingdom.

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

email: reporting@pirbright.ac.uk

The contents of this report should not be reproduced without permission.

Virus sample name:	GHA/Asu/9/2018
Sender reference:	O/GHA/Asu/9/2018
Location of origin:	Asutware
Country of origin:	Ghana
Date of collection:	09/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	n/a
Received for sequencing:	n/a
Created:	26/03/2019
Last updated:	26/03/2019
VIBASys IDs: sample 40777, genome 40778, sequence viba_40779, sequencing info 40780	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40787	GHA/Asu/11/2018	cattle	100.0	0	O	EA-3		
viba_40791	GHA/Asu/12/2018	cattle	100.0	0	O	EA-3		
viba_40783	GHA/Asu/10/2018	cattle	100.0	0	O	EA-3		
viba_37583	SEN/9/2018	cattle	99.8	0	O	EA-3		
viba_36938	ALG/1/2018	cattle	99.8	0	O	EA-3		
viba_37575	SEN/4/2018	cattle	99.8	0	O	EA-3		
viba_37530	MAU/18Z007128/18		99.8	0	O	EA-3		
viba_37567	SEN/1/2018	cattle	99.7	0	O	EA-3		
viba_37252	GNA/18Z005583/18		99.7	0	O	EA-3		
viba_38425	CIV/18Z008489/18	porcine	99.7	0	O	EA-3		

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_116	SUD/2/86	bovine	89.0	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.8	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.6	0	O	EA-3		
viba_50	UGA/17/98		85.4	0	O	EA-4		
viba_30238	MUR/19/2016	cattle	85.3	0	O	ME-SA	Ind-2001	e
viba_285	UKG/35/2001	porcine	84.6	0	O	ME-SA	PanAsia	
viba_85	UGA/3/2002		84.2	0	O	EA-2		
viba_576	IND/R2/75		83.9	0	O	ME-SA		
viba_523	K83/79		83.9	0	O	EA-1		
viba_104	GHA/5/93	bovine	83.9	0	O	WA		

Virus sample name:	GHA/Asu/10/2018
Sender reference:	O/GHA/Asu/10/2018
Location of origin:	Asutware
Country of origin:	Ghana
Date of collection:	09/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	n/a
Received for sequencing:	n/a
Created:	26/03/2019
Last updated:	26/03/2019
VIBASys IDs: sample 40781, genome 40782, sequence viba_40783, sequencing info 40784	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40787	GHA/Asu/11/2018	cattle	100.0	0	O	EA-3		
viba_40791	GHA/Asu/12/2018	cattle	100.0	0	O	EA-3		
viba_40779	GHA/Asu/9/2018	cattle	100.0	0	O	EA-3		
viba_37583	SEN/9/2018	cattle	99.8	0	O	EA-3		
viba_36938	ALG/1/2018	cattle	99.8	0	O	EA-3		
viba_37575	SEN/4/2018	cattle	99.8	0	O	EA-3		
viba_37530	MAU/18Z007128/18		99.8	0	O	EA-3		
viba_37567	SEN/1/2018	cattle	99.7	0	O	EA-3		
viba_37252	GNA/18Z005583/18		99.7	0	O	EA-3		
viba_38425	CIV/18Z008489/18	porcine	99.7	0	O	EA-3		

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_116	SUD/2/86	bovine	89.0	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.8	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.6	0	O	EA-3		
viba_50	UGA/17/98		85.4	0	O	EA-4		
viba_30238	MUR/19/2016	cattle	85.3	0	O	ME-SA	Ind-2001	e
viba_285	UKG/35/2001	porcine	84.6	0	O	ME-SA	PanAsia	
viba_85	UGA/3/2002		84.2	0	O	EA-2		
viba_576	IND/R2/75		83.9	0	O	ME-SA		
viba_523	K83/79		83.9	0	O	EA-1		
viba_104	GHA/5/93	bovine	83.9	0	O	WA		

Virus sample name:	GHA/Asu/11/2018
Sender reference:	O/GHA/Asu/11/2018
Location of origin:	Asutware
Country of origin:	Ghana
Date of collection:	09/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	n/a
Received for sequencing:	n/a
Created:	26/03/2019
Last updated:	26/03/2019
VIBASys IDs: sample 40785, genome 40786, sequence viba_40787, sequencing info 40788	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40791	GHA/Asu/12/2018	cattle	100.0	0	O	EA-3		
viba_40779	GHA/Asu/9/2018	cattle	100.0	0	O	EA-3		
viba_40783	GHA/Asu/10/2018	cattle	100.0	0	O	EA-3		
viba_37583	SEN/9/2018	cattle	99.8	0	O	EA-3		
viba_36938	ALG/1/2018	cattle	99.8	0	O	EA-3		
viba_37575	SEN/4/2018	cattle	99.8	0	O	EA-3		
viba_37530	MAU/18Z007128/18		99.8	0	O	EA-3		
viba_37567	SEN/1/2018	cattle	99.7	0	O	EA-3		
viba_37252	GNA/18Z005583/18		99.7	0	O	EA-3		
viba_38425	CIV/18Z008489/18	porcine	99.7	0	O	EA-3		

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_116	SUD/2/86	bovine	89.0	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.8	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.6	0	O	EA-3		
viba_50	UGA/17/98		85.4	0	O	EA-4		
viba_30238	MUR/19/2016	cattle	85.3	0	O	ME-SA	Ind-2001	e
viba_285	UKG/35/2001	porcine	84.6	0	O	ME-SA	PanAsia	
viba_85	UGA/3/2002		84.2	0	O	EA-2		
viba_576	IND/R2/75		83.9	0	O	ME-SA		
viba_523	K83/79		83.9	0	O	EA-1		
viba_104	GHA/5/93	bovine	83.9	0	O	WA		

Virus sample name:	GHA/Asu/12/2018
Sender reference:	O/GHA/Asu/12/2018
Location of origin:	Asutware
Country of origin:	Ghana
Date of collection:	09/2018
Host species:	cattle
Serotype:	O
Topotype:	EA-3
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	n/a
Harvest date of material:	n/a
Primers:	n/a
Received for sequencing:	n/a
Created:	26/03/2019
Last updated:	26/03/2019
VIBASys IDs: sample 40789, genome 40790, sequence viba_40791, sequencing info 40792	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40787	GHA/Asu/11/2018	cattle	100.0	0	O	EA-3		
viba_40779	GHA/Asu/9/2018	cattle	100.0	0	O	EA-3		
viba_40783	GHA/Asu/10/2018	cattle	100.0	0	O	EA-3		
viba_37583	SEN/9/2018	cattle	99.8	0	O	EA-3		
viba_36938	ALG/1/2018	cattle	99.8	0	O	EA-3		
viba_37575	SEN/4/2018	cattle	99.8	0	O	EA-3		
viba_37530	MAU/18Z007128/18		99.8	0	O	EA-3		
viba_37567	SEN/1/2018	cattle	99.7	0	O	EA-3		
viba_37252	GNA/18Z005583/18		99.7	0	O	EA-3		
viba_38425	CIV/18Z008489/18	porcine	99.7	0	O	EA-3		

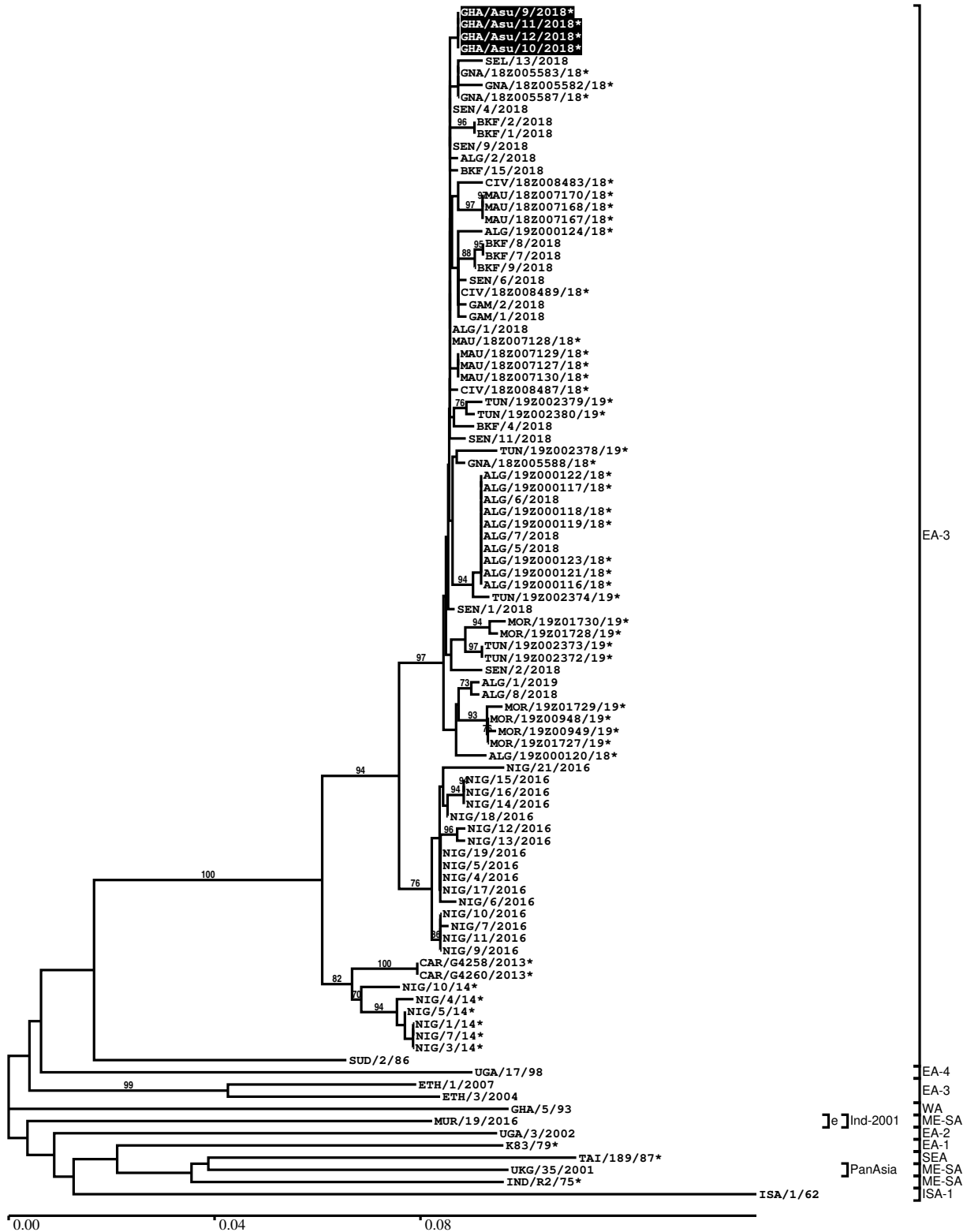
Most Closely Related Prototype Sequences

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

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_116	SUD/2/86	bovine	89.0	0	O	EA-3		
viba_854	ETH/1/2007	cattle	85.8	0	O	EA-3		
viba_408	ETH/3/2004	cattle	85.6	0	O	EA-3		
viba_50	UGA/17/98		85.4	0	O	EA-4		
viba_30238	MUR/19/2016	cattle	85.3	0	O	ME-SA	Ind-2001	e
viba_285	UKG/35/2001	porcine	84.6	0	O	ME-SA	PanAsia	
viba_85	UGA/3/2002		84.2	0	O	EA-2		
viba_576	IND/R2/75		83.9	0	O	ME-SA		
viba_523	K83/79		83.9	0	O	EA-1		
viba_104	GHA/5/93	bovine	83.9	0	O	WA		

Report on FMDV O in Ghana in 2019

Batch: WRLMEG/2019/00023



*, not a WRLFMD Reference Number

Analysis Parameters

VP1 subsequence extractor: vp1_O
 Query sequence set: WRLMEG/2019/00023-Ghana-O (4 sequences)
 Sequence database set: allseqs_O (4394 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: 10
 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
GHA/Asu/9/2018*	LC456870	cattle	NIAH-JAPAN	Ghana	EA-3
GHA/Asu/11/2018*	LC456872	cattle	NIAH-JAPAN	Ghana	EA-3
GHA/Asu/12/2018*	LC456873	cattle	NIAH-JAPAN	Ghana	EA-3
GHA/Asu/10/2018*	LC456871	cattle	NIAH-JAPAN	Ghana	EA-3
SEL/13/2018	n/a	cattle	WRLFMD	Sierra Leone	EA-3
GNA/18Z005583/18*	n/a	n/a	ANSES	Guinea	EA-3
GNA/18Z005582/18*	n/a	n/a	ANSES	Guinea	EA-3
GNA/18Z005587/18*	n/a	n/a	ANSES	Guinea	EA-3
SEN/4/2018	n/a	cattle	WRLFMD	Senegal	EA-3
BKF/2/2018	n/a	cattle	WRLFMD	Burkina Faso	EA-3
BKF/1/2018	n/a	cattle	WRLFMD	Burkina Faso	EA-3
SEN/9/2018	n/a	cattle	WRLFMD	Senegal	EA-3
ALG/2/2018	n/a	cattle	WRLFMD	Algeria	EA-3
BKF/15/2018	n/a	cattle	WRLFMD	Burkina Faso	EA-3
CIV/18Z008483/18*	n/a	porcine	ANSES	Cote d'Ivoire	EA-3
MAU/18Z007170/18*	n/a	n/a	ANSES	Mauritania	EA-3
MAU/18Z007168/18*	n/a	n/a	ANSES	Mauritania	EA-3
MAU/18Z007167/18*	n/a	n/a	ANSES	Mauritania	EA-3
ALG/19Z000124/18*	n/a	caprine	ANSES	Algeria	EA-3
BKF/8/2018	n/a	cattle	WRLFMD	Burkina Faso	EA-3
BKF/7/2018	n/a	cattle	WRLFMD	Burkina Faso	EA-3
BKF/9/2018	n/a	cattle	WRLFMD	Burkina Faso	EA-3
SEN/6/2018	n/a	cattle	WRLFMD	Senegal	EA-3
CIV/18Z008489/18*	n/a	porcine	ANSES	Cote d'Ivoire	EA-3
GAM/2/2018	n/a	cattle	WRLFMD	Gambia	EA-3
GAM/1/2018	n/a	cattle	WRLFMD	Gambia	EA-3
ALG/1/2018	n/a	cattle	WRLFMD	Algeria	EA-3
MAU/18Z007128/18*	n/a	n/a	ANSES	Mauritania	EA-3
MAU/18Z007129/18*	n/a	n/a	ANSES	Mauritania	EA-3
MAU/18Z007127/18*	n/a	n/a	ANSES	Mauritania	EA-3
MAU/18Z007130/18*	n/a	n/a	ANSES	Mauritania	EA-3
CIV/18Z008487/18*	n/a	porcine	ANSES	Cote d'Ivoire	EA-3
TUN/19Z002379/19*	n/a	bovine	ANSES	Tunisia	EA-3
TUN/19Z002380/19*	n/a	bovine	ANSES	Tunisia	EA-3
BKF/4/2018	n/a	cattle	WRLFMD	Burkina Faso	EA-3
SEN/11/2018	n/a	cattle	WRLFMD	Senegal	EA-3

continued on next page

label	accession	host(s)	lab	country	taxonomic information
TUN/19Z002378/19*	n/a	bovine	ANSES	Tunisia	EA-3
GNA/18Z005588/18*	n/a	n/a	ANSES	Guinea	EA-3
ALG/19Z000122/18*	n/a	caprine	ANSES	Algeria	EA-3
ALG/19Z000117/18*	n/a	bovine	ANSES	Algeria	EA-3
ALG/6/2018	n/a	cattle	WRLFMD	Algeria	EA-3
ALG/19Z000118/18*	n/a	bovine	ANSES	Algeria	EA-3
ALG/19Z000119/18*	n/a	bovine	ANSES	Algeria	EA-3
ALG/7/2018	n/a	cattle	WRLFMD	Algeria	EA-3
ALG/5/2018	n/a	cattle	WRLFMD	Algeria	EA-3
ALG/19Z000123/18*	n/a	caprine	ANSES	Algeria	EA-3
ALG/19Z000121/18*	n/a	caprine	ANSES	Algeria	EA-3
ALG/19Z000116/18*	n/a	bovine	ANSES	Algeria	EA-3
TUN/19Z002374/19*	n/a	bovine	ANSES	Tunisia	EA-3
SEN/1/2018	n/a	cattle	WRLFMD	Senegal	EA-3
MOR/19Z01730/19*	n/a	bovine	ANSES	Morocco	EA-3
MOR/19Z01728/19*	n/a	bovine	ANSES	Morocco	EA-3
TUN/19Z002373/19*	n/a	bovine	ANSES	Tunisia	EA-3
TUN/19Z002372/19*	n/a	bovine	ANSES	Tunisia	EA-3
SEN/2/2018	n/a	porcine	WRLFMD	Senegal	EA-3
ALG/1/2019	n/a	cattle	WRLFMD	Algeria	EA-3
ALG/8/2018	n/a	cattle	WRLFMD	Algeria	EA-3
MOR/19Z01729/19*	n/a	bovine	ANSES	Morocco	EA-3
MOR/19Z00948/19*	n/a	bovine	ANSES	Morocco	EA-3
MOR/19Z00949/19*	n/a	bovine	ANSES	Morocco	EA-3
MOR/19Z01727/19*	n/a	bovine	ANSES	Morocco	EA-3
ALG/19Z000120/18*	n/a	ovine	ANSES	Algeria	EA-3
NIG/21/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/15/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/16/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/14/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/18/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/12/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/13/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/19/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/5/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/4/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/17/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/6/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/10/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/7/2016	n/a	sheep	WRLFMD	Nigeria	EA-3
NIG/11/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
NIG/9/2016	n/a	cattle	WRLFMD	Nigeria	EA-3
CAR/G4258/2013*	KY581680	cattle	PIADC	Cameroon	EA-3
CAR/G4260/2013*	KY581679	cattle	PIADC	Cameroon	EA-3
NIG/10/14*	KY041874	bovine	CODA-CERVA	Nigeria	EA-3
NIG/4/14*	KY065153	bovine	CODA-CERVA	Nigeria	EA-3
NIG/5/14*	KY065154	bovine	CODA-CERVA	Nigeria	EA-3
NIG/1/14*	KY041876	bovine	CODA-CERVA	Nigeria	EA-3
NIG/7/14*	KY065151	bovine	CODA-CERVA	Nigeria	EA-3
NIG/3/14*	KY065150	bovine	CODA-CERVA	Nigeria	EA-3
SUD/2/86	DQ165075	bovine	WRLFMD	Sudan	EA-3
UGA/17/98	HM211075	n/a	WRLFMD	Uganda	EA-4
ETH/1/2007	FJ798137	cattle	WRLFMD	Ethiopia	EA-3
ETH/3/2004	FJ798109	cattle	WRLFMD	Ethiopia	EA-3
GHA/5/93	AJ303488	bovine	WRLFMD	Ghana	WA
MUR/19/2016	MG972510	cattle	WRLFMD	Mauritius	ME-SA/Ind-2001/e
UGA/3/2002	DQ165077	n/a	WRLFMD	Uganda	EA-2
K83/79*	AJ303511	n/a	WRLFMD	Kenya	EA-1
TAI/189/87*	KY091288	bovine	TRRL	Thailand	SEA
UKG/35/2001	AJ539141	porcine	PIADC	United Kingdom	ME-SA/PanAsia
IND/R2/75*	AF204276	n/a	PD-FMD	India	ME-SA
ISA/1/62	AJ303500	n/a	WRLFMD	Indonesia	ISA-1

*, not a WRLFMD Reference Number

n/a, not available