

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

Genotyping Report v2*

FMDV serotype: O
Country: Zambia
Year: 2019
Batch: WRLMEG/2019/00038
No. of sequences: 2
Report date: 29th August 2019
Report generated by: Nick Knowles
Report checked by: Jemma Wadsworth

This report is prepared on behalf of the OIE Sub-Saharan Africa Regional Reference laboratory (SSARRL) for FMD (Botswana Vaccine Institute, Gaborone, Botswana) and covers VP1 sequences submitted to the WRLFMD on 9 August 2019.

*, with location data corrected.



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Virus sample name:	ZAM06/2019
Sender reference:	O/ZAM06/2019; CVRI 37/2019
Location of origin:	Kapiri Mposhi, Central Province
Country of origin:	Zambia
Date of collection:	2019
Host species:	bovine
Serotype:	O
Topotype:	EA-2
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	Epithelial tissue RNA extract
Harvest date of material:	n/a
Primers:	O-1C272F/EUR-2B52R
Received for sequencing:	n/a
Created:	11/08/2019
Last updated:	11/08/2019
VIBASys IDs: sample 42462, genome 42463, sequence viba_42464, sequencing info 42465	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_42468	ZAM07/2019	bovine	100.0	0	O	EA-2		
viba_41414	ZAM/4/2019	bovine	99.8	0	O	EA-2		
viba_41406	ZAM/2/2019	bovine	99.8	0	O	EA-2		
viba_41422	ZAM/8/2019	bovine	99.8	0	O	EA-2		
viba_41418	ZAM/7/2019	bovine	99.8	0	O	EA-2		
viba_41410	ZAM/3/2019	bovine	99.7	0	O	EA-2		
viba_36372	ZAM/2/2018	cattle	98.4	0	O	EA-2		
viba_36347	ZAM12/2018	bovine	98.4	0	O	EA-2		
viba_36376	ZAM/3/2018	cattle	98.4	0	O	EA-2		
viba_36343	ZAM10/2018	bovine	98.4	0	O	EA-2		

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_85	UGA/3/2002		89.7	0	O	EA-2		
viba_74	KEN/5/2002	bovine	89.1	0	O	EA-2		
viba_221	MAL/1/98		85.6	0	O	EA-2		
viba_263	TAN/2/2004	bovine	85.5	0	O	EA-2		
viba_354	PAK/16/2010	cattle	83.5	0	O	ME-SA	PanAsia-2	PUN-10
viba_719	IRN/88/2009		83.3	0	O	ME-SA	PanAsia-2	ANT-10
viba_650	IRN/8/2005	ovine	83.2	0	O	ME-SA	PanAsia-2	
viba_854	ETH/1/2007	cattle	83.0	0	O	EA-3		
viba_617	IND/53/79	bovine	82.7	0	O	ME-SA		
viba_576	IND/R2/75		82.4	0	O	ME-SA		

Virus sample name:	ZAM07/2019
Sender reference:	O/ZAM07/2019; CVRI 55/2019
Location of origin:	Chingola, Copperbelt Province
Country of origin:	Zambia
Date of collection:	2019
Host species:	bovine
Serotype:	O
Topotype:	EA-2
Lineage:	
Sublineage:	
Sequence length:	633
Ambiguities:	0
Material submitted for sequencing:	Epithelial tissue RNA extract
Harvest date of material:	n/a
Primers:	O-1C272F/EUR-2B52R
Received for sequencing:	n/a
Created:	11/08/2019
Last updated:	11/08/2019
VIBASys IDs: sample 42466, genome 42467, sequence viba_42468, sequencing info 42469	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_42464	ZAM06/2019	bovine	100.0	0	O	EA-2		
viba_41414	ZAM/4/2019	bovine	99.8	0	O	EA-2		
viba_41406	ZAM/2/2019	bovine	99.8	0	O	EA-2		
viba_41422	ZAM/8/2019	bovine	99.8	0	O	EA-2		
viba_41418	ZAM/7/2019	bovine	99.8	0	O	EA-2		
viba_41410	ZAM/3/2019	bovine	99.7	0	O	EA-2		
viba_36372	ZAM/2/2018	cattle	98.4	0	O	EA-2		
viba_36347	ZAM12/2018	bovine	98.4	0	O	EA-2		
viba_36376	ZAM/3/2018	cattle	98.4	0	O	EA-2		
viba_36343	ZAM10/2018	bovine	98.4	0	O	EA-2		

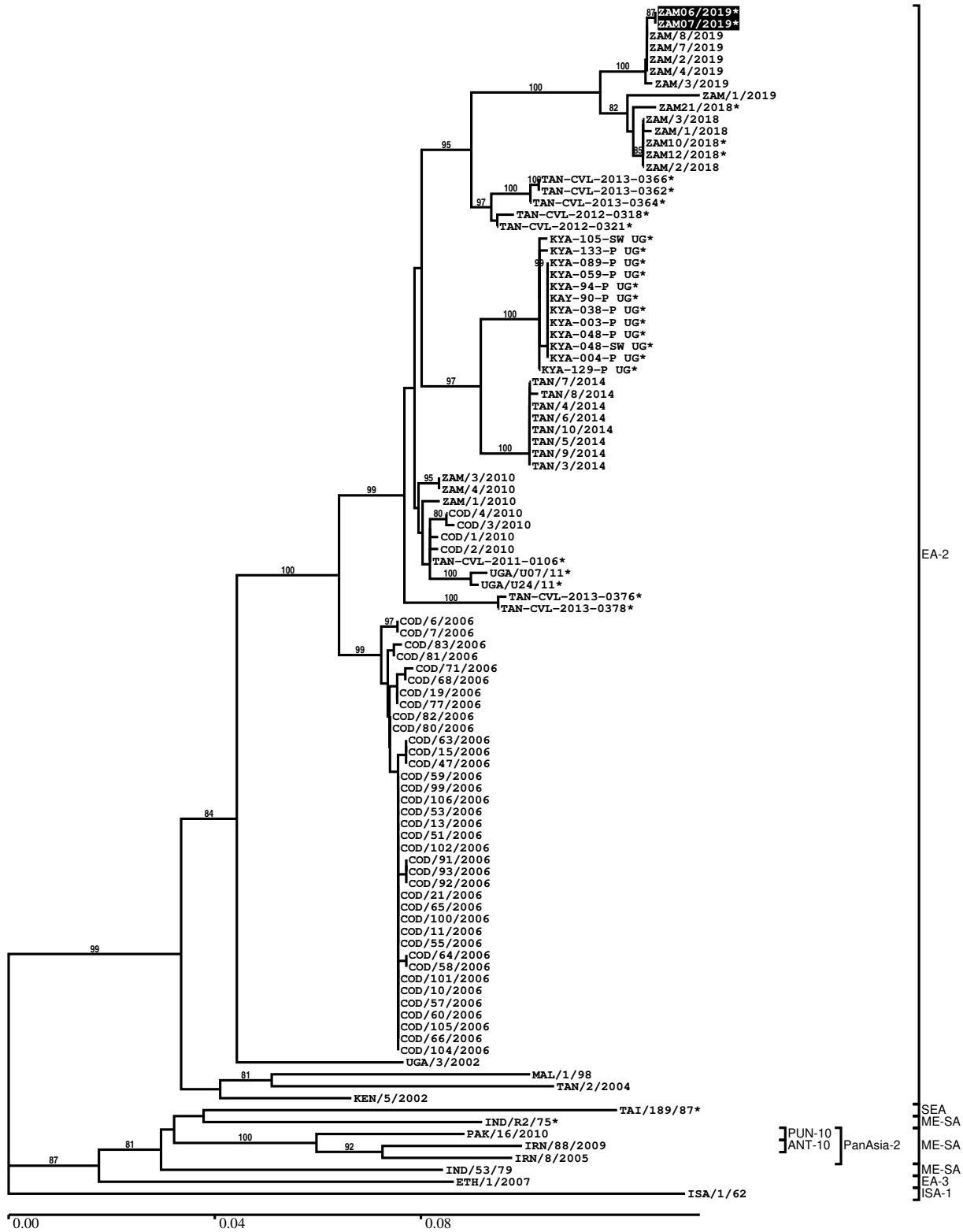
Most Closely Related Prototype Sequences

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

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_85	UGA/3/2002		89.7	0	O	EA-2		
viba_74	KEN/5/2002	bovine	89.1	0	O	EA-2		
viba_221	MAL/1/98		85.6	0	O	EA-2		
viba_263	TAN/2/2004	bovine	85.5	0	O	EA-2		
viba_354	PAK/16/2010	cattle	83.5	0	O	ME-SA	PanAsia-2	PUN-10
viba_719	IRN/88/2009		83.3	0	O	ME-SA	PanAsia-2	ANT-10
viba_650	IRN/8/2005	ovine	83.2	0	O	ME-SA	PanAsia-2	
viba_854	ETH/1/2007	cattle	83.0	0	O	EA-3		
viba_617	IND/53/79	bovine	82.7	0	O	ME-SA		
viba_576	IND/R2/75		82.4	0	O	ME-SA		

Report on FMDV O in Zambia in 2019

Batch: WRLMEG/2019/00038



*, not a WRLFMD Reference Number

Analysis Parameters

VP1 subsequence extractor: vp1_O
 Query sequence set: WRLMEG/2019/00038-Zambia-O (2 sequences)
 Sequence database set: allseqs_O (4603 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
ZAM06/2019*	n/a	bovine	BVI	Zambia	EA-2
ZAM07/2019*	n/a	bovine	BVI	Zambia	EA-2
ZAM/8/2019	n/a	bovine	WRLFMD	Zambia	EA-2
ZAM/7/2019	n/a	bovine	WRLFMD	Zambia	EA-2
ZAM/2/2019	n/a	bovine	WRLFMD	Zambia	EA-2
ZAM/4/2019	n/a	bovine	WRLFMD	Zambia	EA-2
ZAM/3/2019	n/a	bovine	WRLFMD	Zambia	EA-2
ZAM/1/2019	n/a	bovine	WRLFMD	Zambia	EA-2
ZAM21/2018*	n/a	bovine	BVI	Zambia	EA-2
ZAM/3/2018	n/a	cattle	WRLFMD	Zambia	EA-2
ZAM/1/2018	n/a	cattle	WRLFMD	Zambia	EA-2
ZAM10/2018*	n/a	bovine	BVI	Zambia	EA-2
ZAM12/2018*	n/a	bovine	BVI	Zambia	EA-2
ZAM/2/2018	n/a	cattle	WRLFMD	Zambia	EA-2
TAN-CVL-2013-0366*	n/a	cattle	CVL, Tanzania	Tanzania	EA-2
TAN-CVL-2013-0362*	n/a	cattle	CVL, Tanzania	Tanzania	EA-2
TAN-CVL-2013-0364*	n/a	cattle	CVL, Tanzania	Tanzania	EA-2
TAN-CVL-2012-0318*	n/a	bovine	CVL	Tanzania	EA-2
TAN-CVL-2012-0321*	n/a	bovine	CVL	Tanzania	EA-2
KYA-105-SW UG*	KY558333	cattle	PIADC	Uganda	EA-2
KYA-133-P UG*	KY558331	cattle	PIADC	Uganda	EA-2
KYA-089-P UG*	KY558328	cattle	PIADC	Uganda	EA-2
KYA-059-P UG*	KY558327	cattle	PIADC	Uganda	EA-2
KYA-94-P UG*	KY558329	cattle	PIADC	Uganda	EA-2
KAY-90-P UG*	KY548474	cattle	PIADC	Uganda	EA-2
KYA-038-P UG*	KY558325	cattle	PIADC	Uganda	EA-2
KYA-003-P UG*	KY558323	cattle	PIADC	Uganda	EA-2
KYA-048-P UG*	KY558326	cattle	PIADC	Uganda	EA-2
KYA-048-SW UG*	KY558332	cattle	PIADC	Uganda	EA-2
KYA-004-P UG*	KY558324	cattle	PIADC	Uganda	EA-2
KYA-129-P UG*	KY558330	cattle	PIADC	Uganda	EA-2
TAN/7/2014	MF592668	bovine	WRLFMD	Tanzania	EA-2
TAN/8/2014	MF592669	bovine	WRLFMD	Tanzania	EA-2
TAN/4/2014	MF592666	bovine	WRLFMD	Tanzania	EA-2
TAN/6/2014	MF592667	bovine	WRLFMD	Tanzania	EA-2
TAN/10/2014	MF592671	bovine	WRLFMD	Tanzania	EA-2

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label	accession	host(s)	lab	country	taxonomic information
TAN/5/2014	n/a	bovine	WRLFMD	Tanzania	EA-2
TAN/9/2014	MF592670	bovine	WRLFMD	Tanzania	EA-2
TAN/3/2014	MF592665	bovine	WRLFMD	Tanzania	EA-2
ZAM/3/2010	n/a	cattle	WRLFMD	Zambia	EA-2
ZAM/4/2010	n/a	cattle	WRLFMD	Zambia	EA-2
ZAM/1/2010	n/a	cattle	WRLFMD	Zambia	EA-2
COD/4/2010	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/3/2010	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/1/2010	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/2/2010	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
TAN-CVL-2011-0106*	n/a	cattle	CVL, Tanzania	Tanzania	EA-2
UGA/U07/11*	KF478939	cattle	Makerere University	Uganda	EA-2
UGA/U24/11*	KF478941	cattle	Makerere University	Uganda	EA-2
TAN-CVL-2013-0376*	n/a	cattle	CVL, Tanzania	Tanzania	EA-2
TAN-CVL-2013-0378*	n/a	cattle	CVL, Tanzania	Tanzania	EA-2
COD/6/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/7/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/83/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/81/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/71/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/68/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/19/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/77/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/82/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/80/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/63/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/15/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/47/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/59/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2

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label	accession	host(s)	lab	country	taxonomic information
COD/99/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/106/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/53/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/13/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/51/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/102/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/91/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/93/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/92/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/21/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/65/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/100/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/11/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/55/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/64/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/58/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/101/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/10/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/57/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/60/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/105/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/66/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2
COD/104/2006	n/a	cattle	WRLFMD	Democratic Republic of the Congo	EA-2

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label	accession	host(s)	lab	country	taxonomic information
UGA/3/2002	DQ165077	n/a	WRLFMD	Uganda	EA-2
MAL/1/98	DQ165074	n/a	WRLFMD	Malawi	EA-2
TAN/2/2004	KF561679	bovine	WRLFMD	Tanzania	EA-2
KEN/5/2002	DQ165073	bovine	WRLFMD	Kenya	EA-2
TAI/189/87*	KY091288	bovine	TRRL	Thailand	SEA
IND/R2/75*	AF204276	n/a	PD-FMD	India	ME-SA
PAK/16/2010	KY091285	cattle	WRLFMD	Pakistan	ME-SA/PanAsia-2/PUN-10
IRN/88/2009	KY091282	n/a	WRLFMD	Iran	ME-SA/PanAsia-2/ANT-10
IRN/8/2005	KY091281	ovine	WRLFMD	Iran	ME-SA/PanAsia-2
IND/53/79	AF292107	bovine	PD-FMD	India	ME-SA
ETH/1/2007	FJ798137	cattle	WRLFMD	Ethiopia	EA-3
ISA/1/62	AJ303500	n/a	WRLFMD	Indonesia	ISA-1

*, not a WRLFMD Reference Number

n/a, not available