

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

## Genotyping Report

FMDV serotype: SAT2  
Country: Ghana  
Year: 2019  
Batch: WRLMEG/2019/00023  
No. of sequences: 2  
Report date: 26th March 2019  
Report generated by: Nick Knowles  
Report checked by: Jemma Wadsworth



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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:	GHA/Tul/2/2018
Sender reference:	SAT2/GHA/Tul/2/2018
Location of origin:	Tulaku
Country of origin:	Ghana
Date of collection:	09/2018
Host species:	cattle
Serotype:	SAT2
Topotype:	VII
Lineage:	Lib-12
Sublineage:	
Sequence length:	642
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 40793, genome 40794, sequence viba_40795, sequencing info 40796	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40799	GHA/Tul/5/2018	cattle	100.0	0	SAT2	VII	Lib-12	
viba_36870	CAR/G5819/2015	cattle	95.8	0	SAT2	VII	Lib-12	
viba_37103	CHD/7/2016	cattle	94.9	0	SAT2	VII	Lib-12	
viba_20477	CAR/10/2012		93.9	0	SAT2	VII	Lib-12	
viba_20469	CAR/8/2012		93.9	0	SAT2	VII	Lib-12	
viba_35963	CAR/G3796/2012	cattle	93.9	0	SAT2	VII	Lib-12	
viba_20592	LIB/40/2012	cattle	93.9	0	SAT2	VII	Lib-12	
viba_20473	CAR/9/2012		93.9	0	SAT2	VII	Lib-12	
viba_20588	LIB/39/2012	cattle	93.9	0	SAT2	VII	Lib-12	
viba_20596	LIB/41/2012	cattle	93.9	0	SAT2	VII	Lib-12	

#### 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_424	SAU/6/2000	bovine	87.1	1	SAT2	VII		
viba_742	CAR/8/2005	cattle	86.6	0	SAT2	VII		
viba_127	KEN/3/57		76.2	0	SAT2	IX		
viba_756	UGA/19/98		74.8	0	SAT2	X		
viba_380	RHO/1/48		74.8	0	SAT2	III		
viba_374	ZAI/1/74		74.2	0	SAT2	VIII		
viba_189	RWA/1/2000		74.1	0	SAT2	VIII		
viba_470	KEN/2/84	bovine	74.0	0	SAT2	IX		
viba_752	SA/106/59		74.0	0	SAT2	I		
viba_724	ETH/2/91	bovine	73.7	0	SAT2	XIV		

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Serotype:	SAT2
Topotype:	VII
Lineage:	Lib-12
Sublineage:	
Sequence length:	642
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 40797, genome 40798, sequence viba_40799, sequencing info 40800	

#### Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_40795	GHA/Tul/2/2018	cattle	100.0	0	SAT2	VII	Lib-12	
viba_36870	CAR/G5819/2015	cattle	95.8	0	SAT2	VII	Lib-12	
viba_37103	CHD/7/2016	cattle	94.9	0	SAT2	VII	Lib-12	
viba_20477	CAR/10/2012		93.9	0	SAT2	VII	Lib-12	
viba_20469	CAR/8/2012		93.9	0	SAT2	VII	Lib-12	
viba_35963	CAR/G3796/2012	cattle	93.9	0	SAT2	VII	Lib-12	
viba_20592	LIB/40/2012	cattle	93.9	0	SAT2	VII	Lib-12	
viba_20473	CAR/9/2012		93.9	0	SAT2	VII	Lib-12	
viba_20588	LIB/39/2012	cattle	93.9	0	SAT2	VII	Lib-12	
viba_20596	LIB/41/2012	cattle	93.9	0	SAT2	VII	Lib-12	

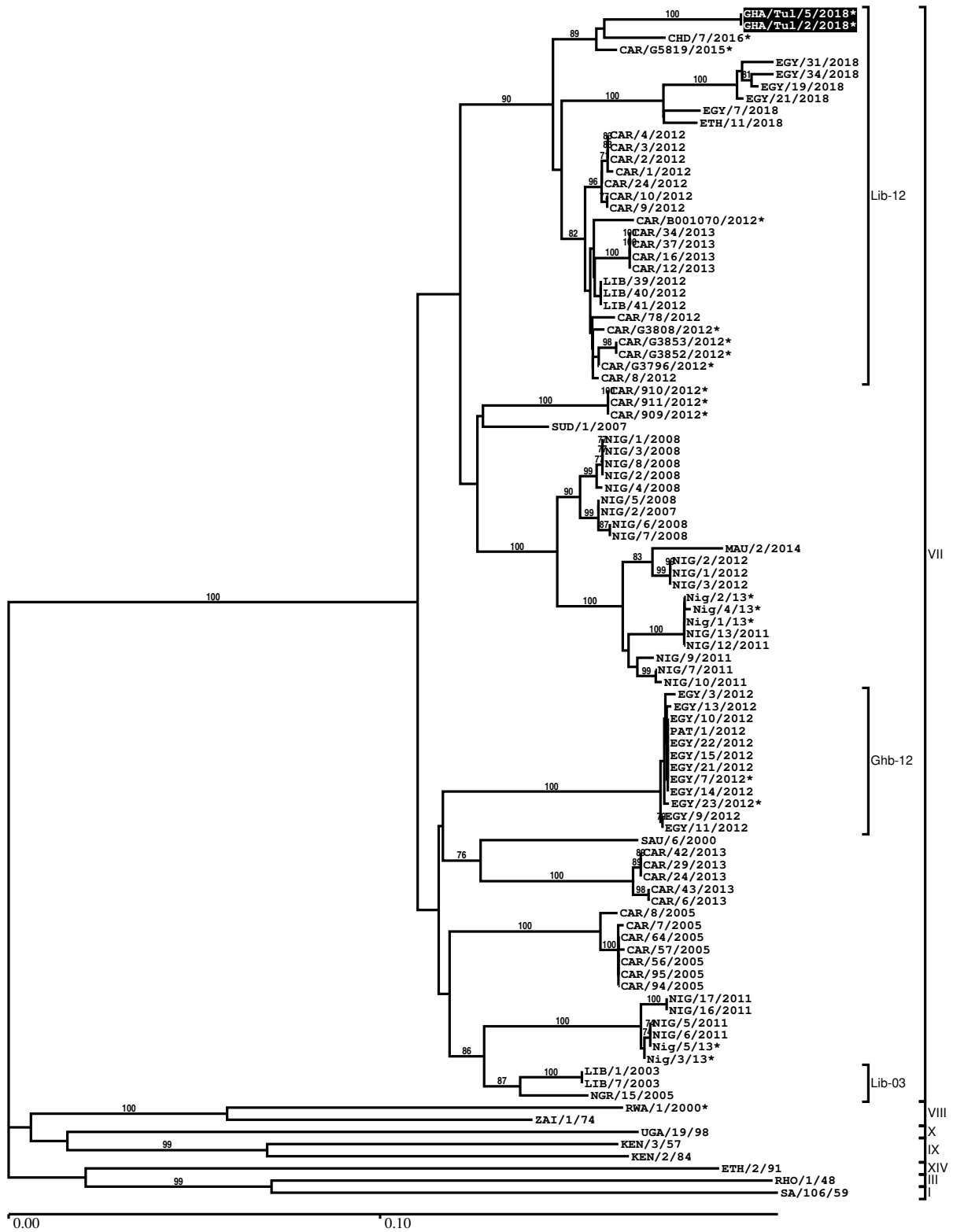
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see [http://www.wrlfmd.org/fmd\\_genotyping/prototypes.htm](http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)

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viba_742	CAR/8/2005	cattle	86.6	0	SAT2	VII		
viba_127	KEN/3/57		76.2	0	SAT2	IX		
viba_756	UGA/19/98		74.8	0	SAT2	X		
viba_380	RHO/1/48		74.8	0	SAT2	III		
viba_374	ZAI/1/74		74.2	0	SAT2	VIII		
viba_189	RWA/11/2000		74.1	0	SAT2	VIII		
viba_470	KEN/2/84	bovine	74.0	0	SAT2	IX		
viba_752	SA/106/59		74.0	0	SAT2	I		
viba_724	ETH/2/91	bovine	73.7	0	SAT2	XIV		

Report on FMDV SAT2 in Ghana in 2019

Batch: WRLMEG/2019/00023



\*, not a WRLFMD Reference Number

## Analysis Parameters

VP1 subsequence extractor:	vp1_SAT2
Query sequence set:	WRLMEG/2019/00023-Ghana-SAT2 (2 sequences)
Sequence database set:	allseqs_SAT2 (884 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
GHA/Tul/5/2018*	LC456875	cattle	NIAH-JAPAN	Ghana	VII/Lib-12
GHA/Tul/2/2018*	LC456874	cattle	NIAH-JAPAN	Ghana	VII/Lib-12
CHD/7/2016*	n/a	cattle	ANSES	Chad	VII/Lib-12
CAR/G5819/2015*	MG873224	cattle	PIADC	Cameroon	VII/Lib-12
EGY/31/2018	n/a	cattle	WRLFMD	Egypt	VII/Lib-12
EGY/34/2018	n/a	cattle	WRLFMD	Egypt	VII/Lib-12
EGY/19/2018	n/a	cattle	WRLFMD	Egypt	VII/Lib-12
EGY/21/2018	n/a	cattle	WRLFMD	Egypt	VII/Lib-12
EGY/7/2018	n/a	cattle	WRLFMD	Egypt	VII/Lib-12
ETH/11/2018	n/a	cattle	WRLFMD	Ethiopia	VII/Lib-12
CAR/4/2012	KX266286	n/a	WRLFMD	Cameroon	VII/Lib-12
CAR/3/2012	KX266285	n/a	WRLFMD	Cameroon	VII/Lib-12
CAR/2/2012	KX266284	n/a	WRLFMD	Cameroon	VII/Lib-12
CAR/1/2012	KX266283	n/a	WRLFMD	Cameroon	VII/Lib-12
CAR/24/2012	KX266290	bovine	WRLFMD	Cameroon	VII/Lib-12
CAR/10/2012	KX266289	n/a	WRLFMD	Cameroon	VII/Lib-12
CAR/9/2012	KX266288	n/a	WRLFMD	Cameroon	VII/Lib-12
CAR/B001070/2012*	KY581675	cattle	PIADC	Cameroon	VII/Lib-12
CAR/34/2013	n/a	cattle	WRLFMD	Cameroon	VII/Lib-12
CAR/37/2013	n/a	cattle	WRLFMD	Cameroon	VII/Lib-12
CAR/16/2013	n/a	cattle	WRLFMD	Cameroon	VII/Lib-12
CAR/12/2013	n/a	cattle	WRLFMD	Cameroon	VII/Lib-12
LIB/39/2012	JX570633	cattle	WRLFMD	Libya	VII/Lib-12
LIB/40/2012	JX570634	cattle	WRLFMD	Libya	VII/Lib-12
LIB/41/2012	JX570635	cattle	WRLFMD	Libya	VII/Lib-12
CAR/78/2012	KX266291	bovine	WRLFMD	Cameroon	VII/Lib-12
CAR/G3808/2012*	KY581673	cattle	PIADC	Cameroon	VII/Lib-12
CAR/G3853/2012*	KY581671	cattle	PIADC	Cameroon	VII/Lib-12
CAR/G3852/2012*	KY581672	cattle	PIADC	Cameroon	VII/Lib-12
CAR/G3796/2012*	KY581674	cattle	PIADC	Cameroon	VII/Lib-12
CAR/8/2012	KX266287	n/a	WRLFMD	Cameroon	VII/Lib-12
CAR/910/2012*	KU720583	cattle	PIADC	Cameroon	VII
CAR/911/2012*	KU720584	cattle	PIADC	Cameroon	VII
CAR/909/2012*	KU720582	cattle	PIADC	Cameroon	VII
SUD/1/2007	GU566071	cattle	WRLFMD	Sudan	VII
NIG/1/2008	KX258076	cattle	WRLFMD	Nigeria	VII

*continued on next page*

label	accession	host(s)	lab	country	taxonomic information
NIG/3/2008	KX258078	cattle	WRLFMD	Nigeria	VII
NIG/8/2008	KX258083	cattle	WRLFMD	Nigeria	VII
NIG/2/2008	KX258077	cattle	WRLFMD	Nigeria	VII
NIG/4/2008	KX258079	cattle	WRLFMD	Nigeria	VII
NIG/5/2008	KX258080	cattle	WRLFMD	Nigeria	VII
NIG/2/2007	JX570636	cattle	WRLFMD	Nigeria	VII
NIG/6/2008	KX258081	cattle	WRLFMD	Nigeria	VII
NIG/7/2008	KX258082	cattle	WRLFMD	Nigeria	VII
MAU/2/2014	KX258073	cattle	WRLFMD	Mauritania	VII
NIG/2/2012	KX258095	bovine	WRLFMD	Nigeria	VII
NIG/1/2012	KX258094	bovine	WRLFMD	Nigeria	VII
NIG/3/2012	KX258096	bovine	WRLFMD	Nigeria	VII
Nig/2/13*	MF624359	bovine	CODA-CERVA	Nigeria	VII
Nig/4/13*	MF624362	bovine	CODA-CERVA	Nigeria	VII
Nig/1/13*	MF624361	bovine	CODA-CERVA	Nigeria	VII
NIG/13/2011	KX258091	bovine	WRLFMD	Nigeria	VII
NIG/12/2011	KX258090	bovine	WRLFMD	Nigeria	VII
NIG/9/2011	KX258088	bovine	WRLFMD	Nigeria	VII
NIG/7/2011	KX258086	bovine	WRLFMD	Nigeria	VII
NIG/10/2011	KX258089	bovine	WRLFMD	Nigeria	VII
EGY/3/2012	JX570618	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/13/2012	JX570625	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/10/2012	JX570623	n/a	WRLFMD	Egypt	VII/Ghb-12
PAT/1/2012	JX570637	cattle	WRLFMD	Palestinian AT	VII/Ghb-12
EGY/22/2012	KF112934	cattle	WRLFMD	Egypt	VII/Ghb-12
EGY/15/2012	JX570627	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/21/2012	KF112933	cattle	WRLFMD	Egypt	VII/Ghb-12
EGY/7/2012*	JX013978	water buffalo	n/a	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/9/2012	JX570622	n/a	WRLFMD	Egypt	VII/Ghb-12
EGY/11/2012	JX570624	n/a	WRLFMD	Egypt	VII/Ghb-12
SAU/6/2000	AF367135	bovine	OVI	Saudi Arabia	VII
CAR/42/2013	n/a	cattle	WRLFMD	Cameroon	VII
CAR/29/2013	n/a	cattle	WRLFMD	Cameroon	VII
CAR/24/2013	n/a	cattle	WRLFMD	Cameroon	VII
CAR/43/2013	n/a	cattle	WRLFMD	Cameroon	VII
CAR/6/2013	n/a	cattle	WRLFMD	Cameroon	VII
CAR/8/2005	JX570616	cattle	WRLFMD	Cameroon	VII
CAR/7/2005	KX258138	cattle	WRLFMD	Cameroon	VII
CAR/64/2005	KX258161	cattle	WRLFMD	Cameroon	VII
CAR/57/2005	KX258156	cattle	WRLFMD	Cameroon	VII
CAR/56/2005	KX258155	cattle	WRLFMD	Cameroon	VII
CAR/95/2005	KX258173	cattle	WRLFMD	Cameroon	VII
CAR/94/2005	KX258172	cattle	WRLFMD	Cameroon	VII
NIG/17/2011	KX258093	bovine	WRLFMD	Nigeria	VII
NIG/16/2011	KX258092	bovine	WRLFMD	Nigeria	VII
NIG/5/2011	KX258084	bovine	WRLFMD	Nigeria	VII
NIG/6/2011	KX258085	bovine	WRLFMD	Nigeria	VII
Nig/5/13*	MF624360	bovine	CODA-CERVA	Nigeria	VII
Nig/3/13*	MF624358	bovine	CODA-CERVA	Nigeria	VII
LIB/1/2003	JX570631	n/a	WRLFMD	Libya	VII/Lib-03
LIB/7/2003	JX570632	n/a	WRLFMD	Libya	VII/Lib-03
NGR/15/2005	KF112960	cattle	WRLFMD	Niger	VII/Lib-03
RWA/1/2000*	AF367134	n/a	OVI	Rwanda	VIII
ZAI/1/74	DQ009737	n/a	OVI	Zaire	VIII
UGA/19/98	AY343969	n/a	OVI	Uganda	X
KEN/3/57	AJ251473	n/a	WRLFMD	Kenya	IX
KEN/2/84	AY343941	bovine	OVI	Kenya	IX
ETH/2/91	AY343938	bovine	OVI	Ethiopia	XIV
RHO/1/48	AY593847	n/a	PIADC	Rhodesia	III
SA/106/59	AY593848	n/a	PIADC	South Africa (SA)	I

\*, not a WRLFMD Reference Number

n/a, not available