

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

Genotyping Report

FMDV serotype: SAT2
Country: Malawi
Year: 2020
Batch: WRLMEG/2020/00028
No. of sequences: 2
Report date: 19th October 2020
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 15th October 2020.



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Virus sample name:	MAL01/2020
Sender reference:	MAL01/2020
Location of origin:	n/a
Country of origin:	Malawi
Date of collection:	09/10/2020
Host species:	bovine
Serotype:	SAT2
Topotype:	I
Lineage:	
Sublineage:	
Sequence length:	642
Ambiguities:	2
Material submitted for sequencing:	Epithelial tissue RNA extract
Harvest date of material:	n/a
Primers:	SAT2-P1-1223F/SAT-2B208R
Received for sequencing:	n/a
Created:	18/10/2020
Last updated:	18/10/2020
VIBASys IDs: sample 45487, genome 45488, sequence viba_45489, sequencing info 45490	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_45493	MAL02/2020	bovine	99.8	2	SAT2	I		
viba_23654	MOZ/2/2014	bovine	96.4	0	SAT2	I		
viba_23650	MOZ/1/2014	bovine	96.3	0	SAT2	I		
viba_23658	MOZ/3/2014	bovine	96.3	0	SAT2	I		
viba_23662	MOZ/4/2014	bovine	96.3	0	SAT2	I		
viba_23671	MOZ04/14	cattle	95.6	2	SAT2	I		
viba_25664	MOZ/1/2015	bovine	95.5	0	SAT2	I		
viba_29664	MOZ/3/2015	bovine	95.5	0	SAT2	I		
viba_25669	MOZ01/15	cattle	95.3	0	SAT2	I		
viba_23675	MOZ05/14	cattle	93.0	1	SAT2	I		

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_752	SA/106/59		81.6	0	SAT2	I		
viba_183	ZIM/14/2002	bovine	80.6	0	SAT2	I		
viba_111	MAL/1/2003	bovine	79.8	0	SAT2	I		
viba_380	RHO/1/48		78.8	0	SAT2	III		
viba_248	KEN/1/84	bovine	78.8	0	SAT2	IV		
viba_451	BOT/P3/98 VUM-29	African buffalo	78.6	1	SAT2	III		
viba_273	ETH/1/90	bovine	78.5	0	SAT2	IV		
viba_567	ZIM/7/83	bovine	77.7	0	SAT2	II		
viba_546	ZIM/5/81	bovine	75.0	0	SAT2	II		
viba_500	NIG/2/75	bovine	74.2	0	SAT2	V		

Virus sample name:	MAL02/2020
Sender reference:	MAL02/2020
Location of origin:	n/a
Country of origin:	Malawi
Date of collection:	09/10/2020
Host species:	bovine
Serotype:	SAT2
Topotype:	I
Lineage:	
Sublineage:	
Sequence length:	642
Ambiguities:	2
Material submitted for sequencing:	Epithelial tissue RNA extract
Harvest date of material:	n/a
Primers:	SAT2-P1-1223F/SAT-2B208R
Received for sequencing:	n/a
Created:	18/10/2020
Last updated:	18/10/2020
VIBASys IDs: sample 45491, genome 45492, sequence viba_45493, sequencing info 45494	

Most Closely Related Sequences

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_45489	MAL01/2020	bovine	99.8	2	SAT2	I		
viba_23654	MOZ2/2014	bovine	96.6	0	SAT2	I		
viba_23650	MOZ1/2014	bovine	96.4	0	SAT2	I		
viba_23658	MOZ3/2014	bovine	96.4	0	SAT2	I		
viba_23662	MOZ4/2014	bovine	96.4	0	SAT2	I		
viba_23671	MOZ04/14	cattle	95.8	2	SAT2	I		
viba_25664	MOZ1/2015	bovine	95.6	0	SAT2	I		
viba_29664	MOZ3/2015	bovine	95.6	0	SAT2	I		
viba_25669	MOZ01/15	cattle	95.5	0	SAT2	I		
viba_23675	MOZ05/14	cattle	93.1	1	SAT2	I		

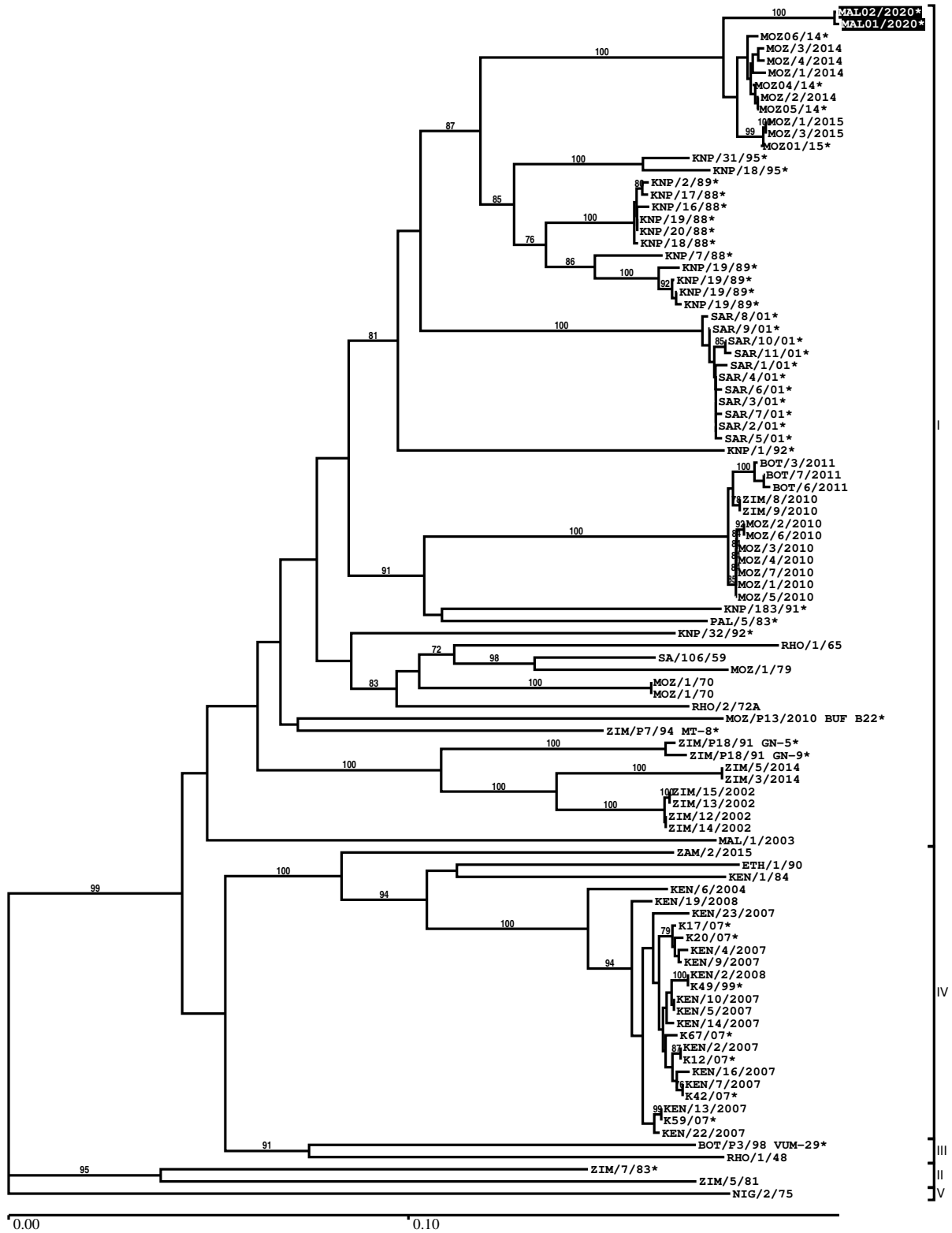
Most Closely Related Prototype Sequences

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

sequence	virus name	Host	% Id.	# Ambig.	serotype	topotype	lineage	sublineage
viba_752	SA/106/59		81.5	0	SAT2	I		
viba_183	ZIM/14/2002	bovine	80.7	0	SAT2	I		
viba_111	MAL/1/2003	bovine	79.9	0	SAT2	I		
viba_248	KEN/1/84	bovine	79.0	0	SAT2	IV		
viba_380	RHO/1/48		78.9	0	SAT2	III		
viba_273	ETH/1/90	bovine	78.6	0	SAT2	IV		
viba_451	BOT/P3/98 VUM-29	African buffalo	78.5	1	SAT2	III		
viba_567	ZIM/7/83	bovine	77.5	0	SAT2	II		
viba_546	ZIM/5/81	bovine	75.2	0	SAT2	II		
viba_500	NIG/2/75	bovine	74.2	0	SAT2	V		

Report on FMDV SAT2 in Malawi in 2020

Batch: WRLMEG/2020/00028



*, not a WRLFMD Reference Number

Analysis Parameters

VP1 subsequence extractor:	vp1_SAT2
Query sequence set:	WRLMEG/2020/00028-Malawi-SAT2 (2 sequences)
Sequence database set:	allseqs_SAT2 (1029 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
MAL02/2020*	n/a	bovine	BVI	Malawi	I
MAL01/2020*	n/a	bovine	BVI	Malawi	I
MOZ06/14*	n/a	cattle	BVI	Mozambique	I
MOZ/3/2014	n/a	bovine	WRLFMD	Mozambique	I
MOZ/4/2014	n/a	bovine	WRLFMD	Mozambique	I
MOZ/1/2014	n/a	bovine	WRLFMD	Mozambique	I
MOZ04/14*	n/a	cattle	BVI	Mozambique	I
MOZ/2/2014	n/a	bovine	WRLFMD	Mozambique	I
MOZ05/14*	n/a	cattle	BVI	Mozambique	I
MOZ/1/2015	n/a	bovine	WRLFMD	Mozambique	I
MOZ/3/2015	n/a	bovine	WRLFMD	Mozambique	I
MOZ01/15*	n/a	cattle	BVI	Mozambique	I
KNP/31/95*	AF367119	African buffalo	OVI	South Africa (KNP)	I
KNP/18/95*	AF367118	African buffalo	OVI	South Africa (KNP)	I
KNP/2/89*	AF367109	impala	OVI	South Africa (KNP)	I
KNP/17/88*	AF367105	impala	OVI	South Africa (KNP)	I
KNP/16/88*	AF367104	impala	OVI	South Africa (KNP)	I
KNP/19/88*	AF367106	impala	OVI	South Africa (KNP)	I
KNP/20/88*	AF367107	impala	OVI	South Africa (KNP)	I
KNP/18/88*	AF367138	impala	OVI	South Africa (KNP)	I
KNP/7/88*	AF367103	African buffalo	OVI	South Africa (KNP)	I
KNP/19/89*	DQ009735	African buffalo	OVI	South Africa (KNP)	I
KNP/19/89*	n/a	African buffalo	WRLFMD	South Africa (KNP)	I
KNP/19/89*	AF367110	African buffalo	OVI	South Africa (KNP)	I
KNP/19/89*	n/a	African buffalo	WRLFMD	South Africa (KNP)	I

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label	accession	host(s)	lab	country	taxonomic information
SAR/8/01*	AY442910	n/a	OVI	Republic of South Africa	I
SAR/9/01*	AY442911	n/a	OVI	Republic of South Africa	I
SAR/10/01*	AY442912	n/a	OVI	Republic of South Africa	I
SAR/11/01*	AY442913	n/a	OVI	Republic of South Africa	I
SAR/1/01*	AY442903	n/a	OVI	Republic of South Africa	I
SAR/4/01*	AY442906	n/a	OVI	Republic of South Africa	I
SAR/6/01*	AY442908	n/a	OVI	Republic of South Africa	I
SAR/3/01*	AY442905	n/a	OVI	Republic of South Africa	I
SAR/7/01*	AY442909	n/a	OVI	Republic of South Africa	I
SAR/2/01*	AY442904	n/a	OVI	Republic of South Africa	I
SAR/5/01*	AY442907	n/a	OVI	Republic of South Africa	I
KNP/1/92*	AF367114	impala	OVI	South Africa (KNP)	I
BOT/3/2011	n/a	cattle	WRLFMD	Botswana	I
BOT/7/2011	n/a	cattle	WRLFMD	Botswana	I
BOT/6/2011	n/a	cattle	WRLFMD	Botswana	I
ZIM/8/2010	n/a	bovine	WRLFMD	Zimbabwe	I
ZIM/9/2010	n/a	bovine	WRLFMD	Zimbabwe	I
MOZ/2/2010	n/a	cattle	WRLFMD	Mozambique	I
MOZ/6/2010	n/a	cattle	WRLFMD	Mozambique	I
MOZ/3/2010	n/a	cattle	WRLFMD	Mozambique	I
MOZ/4/2010	n/a	cattle	WRLFMD	Mozambique	I
MOZ/7/2010	n/a	n/a	WRLFMD	Mozambique	I
MOZ/1/2010	n/a	cattle	WRLFMD	Mozambique	I
MOZ/5/2010	n/a	cattle	WRLFMD	Mozambique	I
KNP/183/91*	AF367112	African buffalo	OVI	South Africa (KNP)	I
PAL/5/83*	AF367102	n/a	OVI	South Africa (PAL)	I
KNP/32/92*	AF367115	African buffalo	OVI	South Africa (KNP)	I
RHO/1/65	n/a	n/a	WRLFMD	Rhodesia	I
SA/106/59	AY593848	n/a	PIADC	South Africa (SA)	I
MOZ/1/79	AF367137	n/a	OVI	Mozambique	I
MOZ/1/70	n/a	n/a	WRLFMD	Mozambique	I
MOZ/1/70	KF112959	n/a	WRLFMD	Mozambique	I
RHO/2/72A	KF112962	cattle	WRLFMD	Rhodesia	I
MOZ/P13/2010 BUF B22*	KF219692	African buffalo	WRLFMD	Mozambique	I
ZIM/P7/94 MT-8*	n/a	n/a	WRLFMD	Zimbabwe	I
ZIM/P18/91 GN-5*	n/a	African buffalo	WRLFMD	Zimbabwe	I
ZIM/P18/91 GN-9*	n/a	African buffalo	WRLFMD	Zimbabwe	I
ZIM/5/2014	n/a	bovine	WRLFMD	Zimbabwe	I
ZIM/3/2014	n/a	bovine	WRLFMD	Zimbabwe	I
ZIM/15/2002	n/a	bovine	WRLFMD	Zimbabwe	I
ZIM/13/2002	n/a	bovine	WRLFMD	Zimbabwe	I
ZIM/12/2002	n/a	bovine	WRLFMD	Zimbabwe	I
ZIM/14/2002	KF219689	bovine	WRLFMD	Zimbabwe	I
MAL/1/2003	n/a	bovine	WRLFMD	Malawi	I
ZAM/2/2015	n/a	bovine	WRLFMD	Zambia	IV
ETH/1/90	AY343935	bovine	OVI	Ethiopia	IV
KEN/1/84	AY344505	bovine	OVI	Kenya	IV
KEN/6/2004	n/a	cattle	WRLFMD	Kenya	IV
KEN/19/2008	n/a	cattle	WRLFMD	Kenya	IV
KEN/23/2007	n/a	cattle	WRLFMD	Kenya	IV
K17/07*	HM623705	n/a	n/a	Kenya	IV
K20/07*	HM623706	n/a	n/a	Kenya	IV

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label	accession	host(s)	lab	country	taxonomic information
KEN/4/2007	n/a	cattle	WRLFMD	Kenya	IV
KEN/9/2007	n/a	cattle	WRLFMD	Kenya	IV
KEN/2/2008	n/a	cattle	WRLFMD	Kenya	IV
K49/99*	HM623698	n/a	Makerere University	Kenya	IV
KEN/10/2007	n/a	cattle	WRLFMD	Kenya	IV
KEN/5/2007	n/a	cattle	WRLFMD	Kenya	IV
KEN/14/2007	n/a	cattle	WRLFMD	Kenya	IV
K67/07*	HM623709	n/a	n/a	Kenya	IV
KEN/2/2007	n/a	cattle	WRLFMD	Kenya	IV
K12/07*	HM623703	n/a	n/a	Kenya	IV
KEN/16/2007	n/a	cattle	WRLFMD	Kenya	IV
KEN/7/2007	n/a	cattle	WRLFMD	Kenya	IV
K42/07*	HM623707	n/a	n/a	Kenya	IV
KEN/13/2007	n/a	cattle	WRLFMD	Kenya	IV
K59/07*	HM623708	n/a	n/a	Kenya	IV
KEN/22/2007	n/a	cattle	WRLFMD	Kenya	IV
BOT/P3/98 VUM-29*	AF367124	African buffalo	OVI	Botswana	III
RHO/1/48	AY593847	n/a	PIADC	Rhodesia	III
ZIM/7/83*	AF136607	bovine	OVI	Zimbabwe	II
ZIM/5/81	EF134951	bovine	WRLFMD	Zimbabwe	II
NIG/2/75	AF367139	bovine	OVI	Nigeria	V

*, not a WRLFMD Reference Number

n/a, not available