



FMD Genotyping Report

Lab Reference WRL batch Number: WRLFMD/2023/000106

Sender Details:

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Date Received: 11/12/2023

Country of Origin*: Malawi

Work has now been completed in respect of the sequences recently submitted and the details are as attached. Please note that all our phylogenetic trees can be accessed via the internet at: <http://www.wrlfmd.org/>

Results Approved By:

Official Stamp:

[REDACTED]

[REDACTED]

Date: 13/2/24

[REDACTED]

To help us improve the quality of our service, please send any suggestions or requests to the Reference Laboratory by email (reflabsfeedback@pirbright.ac.uk).

* Data supplied by the customer

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

Genotyping Report

FMDV serotype: O
Country: Malawi
Year: 2022
Batch: WRLFMD/2023/000106
No. of sequences: 2
Report date: 24th January 2024
Report generated by: Nick Knowles
Report checked by: Jemma Wadsworth



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

email: reporting@pirbright.ac.uk

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| | |
|---|--|
| Virus sample name: | MAL/1/2022 |
| Sender reference: | 2 |
| Location of origin: | Lilongwe |
| Country of origin: | Malawi |
| Date of collection: | 01/04/2022 |
| 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: | 11/01/2024 |
| Primers: | O-1C244F & O-1C272F/EUR-2B52R; FMD-3161F/FMD-4303R |
| Received for sequencing: | 22/01/2024 |
| Created: | 24/01/2024 |
| Last updated: | 24/01/2024 |
| VIBASys IDs: sample 54861, genome 54862, sequence viba_54863, sequencing info 54864 | |

Most Closely Related Sequences

| sequence | virus name | Host | % Id. | # Ambig. | serotype | topotype | lineage | sublineage |
|------------|-------------|--------|-------|----------|----------|----------|---------|------------|
| viba_50496 | MAL03/2022 | cattle | 100.0 | 0 | O | EA-2 | | |
| viba_54867 | MAL/2/2022 | cattle | 100.0 | 0 | O | EA-2 | | |
| viba_51008 | MOZ04/2022 | bovine | 99.7 | 0 | O | EA-2 | | |
| viba_50433 | ZAM/12/2018 | cattle | 99.5 | 0 | O | EA-2 | | |
| viba_48327 | ZAM/7/2021 | cattle | 98.9 | 0 | O | EA-2 | | |
| viba_50437 | ZAM/13/2018 | cattle | 98.9 | 0 | O | EA-2 | | |
| viba_48331 | ZAM/9/2021 | cattle | 96.8 | 0 | O | EA-2 | | |
| viba_50472 | NMB/1/2021 | cattle | 96.8 | 0 | O | EA-2 | | |
| viba_48335 | ZAM/11/2021 | cattle | 96.8 | 0 | O | EA-2 | | |
| viba_48485 | NAM13/2021 | bovine | 96.4 | 1 | 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_85 | UGA/3/2002 | | 89.4 | 0 | O | EA-2 | | |
| viba_74 | KEN/5/2002 | bovine | 87.8 | 0 | O | EA-2 | | |
| viba_1893 | K40/84 | bovine | 85.5 | 0 | O | EA-1 | | |
| viba_221 | MAL/1/98 | | 85.3 | 0 | O | EA-2 | | |
| viba_263 | TAN/2/2004 | bovine | 84.7 | 0 | O | EA-2 | | |
| viba_38646 | SYR/18/62 | | 84.5 | 0 | O | WCSA-1 | Syr-62 | |
| viba_854 | ETH/1/2007 | cattle | 84.0 | 0 | O | EA-3 | | |
| viba_116 | SUD/2/86 | bovine | 83.8 | 0 | O | EA-3 | | |
| viba_35331 | SRL/1/78 | | 83.7 | 0 | O | WCSA-1 | Srl-77 | |
| viba_293 | BHU/3/2009 | cattle | 83.1 | 0 | O | ME-SA | Ind-2001 | d |

| | |
|---|--|
| Virus sample name: | MAL/2/2022 |
| Sender reference: | 10 |
| Location of origin: | Lilongwe |
| Country of origin: | Malawi |
| Date of collection: | 01/04/2022 |
| 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: | 11/01/2024 |
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| Received for sequencing: | 22/01/2024 |
| Created: | 24/01/2024 |
| Last updated: | 24/01/2024 |
| VIBASys IDs: sample 54865, genome 54866, sequence viba_54867, sequencing info 54868 | |

Most Closely Related Sequences

| sequence | virus name | Host | % Id. | # Ambig. | serotype | topotype | lineage | sublineage |
|------------|-------------|--------|-------|----------|----------|----------|---------|------------|
| viba_50496 | MAL03/2022 | cattle | 100.0 | 0 | O | EA-2 | | |
| viba_54863 | MAL/1/2022 | cattle | 100.0 | 0 | O | EA-2 | | |
| viba_51008 | MOZ04/2022 | bovine | 99.7 | 0 | O | EA-2 | | |
| viba_50433 | ZAM/12/2018 | cattle | 99.5 | 0 | O | EA-2 | | |
| viba_48327 | ZAM/7/2021 | cattle | 98.9 | 0 | O | EA-2 | | |
| viba_50437 | ZAM/13/2018 | cattle | 98.9 | 0 | O | EA-2 | | |
| viba_48331 | ZAM/9/2021 | cattle | 96.8 | 0 | O | EA-2 | | |
| viba_50472 | NMB/1/2021 | cattle | 96.8 | 0 | O | EA-2 | | |
| viba_48335 | ZAM/11/2021 | cattle | 96.8 | 0 | O | EA-2 | | |
| viba_48485 | NAM13/2021 | bovine | 96.4 | 1 | 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_85 | UGA/3/2002 | | 89.4 | 0 | O | EA-2 | | |
| viba_74 | KEN/5/2002 | bovine | 87.8 | 0 | O | EA-2 | | |
| viba_1893 | K40/84 | bovine | 85.5 | 0 | O | EA-1 | | |
| viba_221 | MAL/1/98 | | 85.3 | 0 | O | EA-2 | | |
| viba_263 | TAN/2/2004 | bovine | 84.7 | 0 | O | EA-2 | | |
| viba_38646 | SYR/18/62 | | 84.5 | 0 | O | WCSA-1 | Syr-62 | |
| viba_854 | ETH/1/2007 | cattle | 84.0 | 0 | O | EA-3 | | |
| viba_116 | SUD/2/86 | bovine | 83.8 | 0 | O | EA-3 | | |
| viba_35331 | SRL/1/78 | | 83.7 | 0 | O | WCSA-1 | Srl-77 | |
| viba_293 | BHU/3/2009 | cattle | 83.1 | 0 | O | ME-SA | Ind-2001 | d |

Analysis Parameters

| | |
|--|---|
| VP1 subsequence extractor: | vp1_O |
| Query sequence set: | WRLFMD/2023/000106-Malawi-O (2 sequences) |
| Sequence database set: | allseqs_O (6175 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: | 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 |
|-------------|-----------|---------|--------|------------|-----------------------|
| MAL/1/2022 | n/a | cattle | WRLFMD | Malawi | EA-2 |
| MAL03/2022* | n/a | cattle | BVI | Malawi | EA-2 |
| MAL/2/2022 | n/a | cattle | WRLFMD | Malawi | EA-2 |
| MOZ04/2022* | n/a | bovine | BVI | Mozambique | EA-2 |
| ZAM/12/2018 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/13/2018 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/7/2021 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| NMB/1/2021 | n/a | cattle | WRLFMD | Namibia | EA-2 |
| NAM13/2021* | OM260015 | bovine | BVI | Namibia | EA-2 |
| ZAM/11/2021 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/9/2021 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/1/2019 | n/a | bovine | WRLFMD | 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 |
| ZAM21/2018* | n/a | bovine | BVI | Zambia | EA-2 |
| ZAM/10/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/9/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/8/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/12/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/11/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/4/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/3/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/7/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/6/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/15/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/62/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/16/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/14/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/16/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/15/2020 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/60/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/54/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/58/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |

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| label | accession | host(s) | lab | country | taxonomic information |
|--------------------|-----------|---------|---------------------|----------------------------------|-----------------------|
| ZAM/28/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/3/2019 | n/a | bovine | WRLFMD | Zambia | EA-2 |
| ZAM/57/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/7/2019 | n/a | bovine | WRLFMD | Zambia | EA-2 |
| ZAM/1/2020 | n/a | porcine | WRLFMD | Zambia | EA-2 |
| ZAM/2/2020 | n/a | porcine | WRLFMD | Zambia | EA-2 |
| ZAM/4/2019 | n/a | bovine | WRLFMD | Zambia | EA-2 |
| ZAM/18/2019 | n/a | porcine | WRLFMD | Zambia | EA-2 |
| ZAM/2/2019 | n/a | bovine | WRLFMD | Zambia | EA-2 |
| ZAM07/2019* | n/a | bovine | BVI | Zambia | EA-2 |
| ZAM/21/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/27/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/20/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/26/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM06/2019* | n/a | bovine | BVI | Zambia | EA-2 |
| ZAM/8/2019 | n/a | bovine | WRLFMD | Zambia | EA-2 |
| ZAM/55/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/56/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/24/2019 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| TAN-CVL-2013-0362* | n/a | cattle | CVL, Tanzania | Tanzania | EA-2 |
| TAN-CVL-2013-0366* | 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 |
| UGA/U24/11* | KF478941 | cattle | Makerere University | Uganda | EA-2 |
| UGA/U07/11* | KF478939 | cattle | Makerere University | Uganda | EA-2 |
| ZAM/4/2010 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| ZAM/3/2010 | n/a | cattle | WRLFMD | Zambia | 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 |
| 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 |
| ZAM/1/2010 | n/a | cattle | WRLFMD | Zambia | EA-2 |
| COD/6/2006 | 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/105/2006 | 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/99/2006 | 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/51/2006 | 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 |

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| label | accession | host(s) | lab | country | taxonomic information |
|--------------|-----------|---------|--------|----------------------------------|-----------------------|
| COD/55/2006 | 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 |
| COD/65/2006 | 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/11/2006 | 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/60/2006 | 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/80/2006 | 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 |
| 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 |
| UGA/3/2002 | DQ165077 | n/a | WRLFMD | Uganda | EA-2 |
| K40/84* | KY091280 | bovine | WRLFMD | Kenya | EA-1 |
| TAI/189/87* | KY091288 | bovine | TRRL | Thailand | SEA/Tai-87 |
| BHU/3/2009 | KM921814 | cattle | WRLFMD | Bhutan | ME-SA/Ind-2001/d |
| SYR/18/62 | MK390935 | n/a | WRLFMD | Syria | WCSA-1/Syr-62 |
| SRL/1/78 | MK390916 | n/a | WRLFMD | Sri Lanka | WCSA-1/Sri-77 |
| ETH/1/2007 | FJ798137 | cattle | WRLFMD | Ethiopia | EA-3 |
| SUD/2/86 | DQ165075 | bovine | WRLFMD | Sudan | EA-3 |
| ISA/1/62 | AJ303500 | n/a | WRLFMD | Indonesia | ISA-1 |

*, not a WRLFMD Reference Number

n/a, not available