

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

Genotyping Report

FMDV serotype: SAT1
Country: Botswana
Year: 2020
Batch: WRLMEG/2020/00027
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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www: <http://www.wrlfmd.org/>

email: reporting@pirbright.ac.uk

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| | |
|---|-------------------------------|
| Virus sample name: | BOT08/2020 |
| Sender reference: | BOT08/2020 |
| Location of origin: | n/a |
| Country of origin: | Botswana |
| Date of collection: | 10/2020 |
| Host species: | bovine |
| Serotype: | SAT1 |
| Topotype: | III |
| Lineage: | |
| Sublineage: | |
| Sequence length: | 657 |
| Ambiguities: | 0 |
| Material submitted for sequencing: | Epithelial tissue RNA extract |
| Harvest date of material: | n/a |
| Primers: | SAT1-1C559F/SAT-2B208R |
| Received for sequencing: | n/a |
| Created: | 18/10/2020 |
| Last updated: | 18/10/2020 |
| VIBASys IDs: sample 45478, genome 45479, sequence viba_45480, sequencing info 45481 | |

Most Closely Related Sequences

| sequence | virus name | Host | % Id. | # Ambig. | serotype | topotype | lineage | sublineage |
|------------|------------|-----------------|-------|----------|----------|----------|---------|------------|
| viba_45484 | BOT10/2020 | bovine | 99.8 | 0 | SAT1 | III | | |
| viba_23452 | BOT/2/2014 | bovine | 96.7 | 0 | SAT1 | III | | |
| viba_23456 | BOT/3/2014 | bovine | 96.7 | 0 | SAT1 | III | | |
| viba_23460 | BOT/4/2014 | bovine | 96.7 | 0 | SAT1 | III | | |
| viba_23469 | BOT06/14 | cattle | 96.0 | 0 | SAT1 | III | | |
| viba_23465 | BOT05/14 | cattle | 93.6 | 0 | SAT1 | III | | |
| viba_1191 | SWA/40/61 | | 89.8 | 0 | SAT1 | III | | |
| viba_1194 | SWA/40/61 | | 89.8 | 0 | SAT1 | III | | |
| viba_2954 | NAM/307/98 | African buffalo | 89.5 | 0 | SAT1 | III | | |
| viba_1198 | SWA/80/62 | | 89.3 | 0 | SAT1 | III | | |

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_509 | BOT/1/77 | bovine | 89.2 | 0 | SAT1 | III | | |
| viba_495 | BOT/1/68 | bovine | 88.9 | 0 | SAT1 | III | | |
| viba_212 | BEC/1/48 | | 85.6 | 0 | SAT1 | III | | |
| viba_16635 | MOZ/P13/2010 BUF B16 | African buffalo | 78.2 | 0 | SAT1 | XIII | | |
| viba_30769 | MOZ/1/75 | cattle | 76.7 | 0 | SAT1 | XIII | | |
| viba_462 | RV/11/37 | greater kudu | 76.7 | 0 | SAT1 | II | | |
| viba_709 | RHO/5/66 | bovine | 76.1 | 0 | SAT1 | II | | |
| viba_466 | T155/71 | cattle | 75.3 | 0 | SAT1 | I | | |
| viba_514 | UGA-BUFF/21/70 | African buffalo | 74.2 | 0 | SAT1 | IV | | |
| viba_446 | NIG/11/75 | bovine | 72.6 | 0 | SAT1 | V | | |

| | |
|---|-------------------------------|
| Virus sample name: | BOT10/2020 |
| Sender reference: | BOT10/2020 |
| Location of origin: | n/a |
| Country of origin: | Botswana |
| Date of collection: | 10/2020 |
| Host species: | bovine |
| Serotype: | SAT1 |
| Topotype: | III |
| Lineage: | |
| Sublineage: | |
| Sequence length: | 657 |
| Ambiguities: | 0 |
| Material submitted for sequencing: | Epithelial tissue RNA extract |
| Harvest date of material: | n/a |
| Primers: | SAT1-1C559F/SAT-2B208R |
| Received for sequencing: | n/a |
| Created: | 18/10/2020 |
| Last updated: | 18/10/2020 |
| VIBASys IDs: sample 45482, genome 45483, sequence viba_45484, sequencing info 45485 | |

Most Closely Related Sequences

| sequence | virus name | Host | % Id. | # Ambig. | serotype | topotype | lineage | sublineage |
|------------|------------|-----------------|-------|----------|----------|----------|---------|------------|
| viba_45480 | BOT08/2020 | bovine | 99.8 | 0 | SAT1 | III | | |
| viba_23452 | BOT/2/2014 | bovine | 96.5 | 0 | SAT1 | III | | |
| viba_23456 | BOT/3/2014 | bovine | 96.5 | 0 | SAT1 | III | | |
| viba_23460 | BOT/4/2014 | bovine | 96.5 | 0 | SAT1 | III | | |
| viba_23469 | BOT06/14 | cattle | 95.9 | 0 | SAT1 | III | | |
| viba_23465 | BOT05/14 | cattle | 93.5 | 0 | SAT1 | III | | |
| viba_1191 | SWA/40/61 | | 89.6 | 0 | SAT1 | III | | |
| viba_1194 | SWA/40/61 | | 89.6 | 0 | SAT1 | III | | |
| viba_2954 | NAM/307/98 | African buffalo | 89.3 | 0 | SAT1 | III | | |
| viba_1198 | SWA/80/62 | | 89.2 | 0 | SAT1 | III | | |

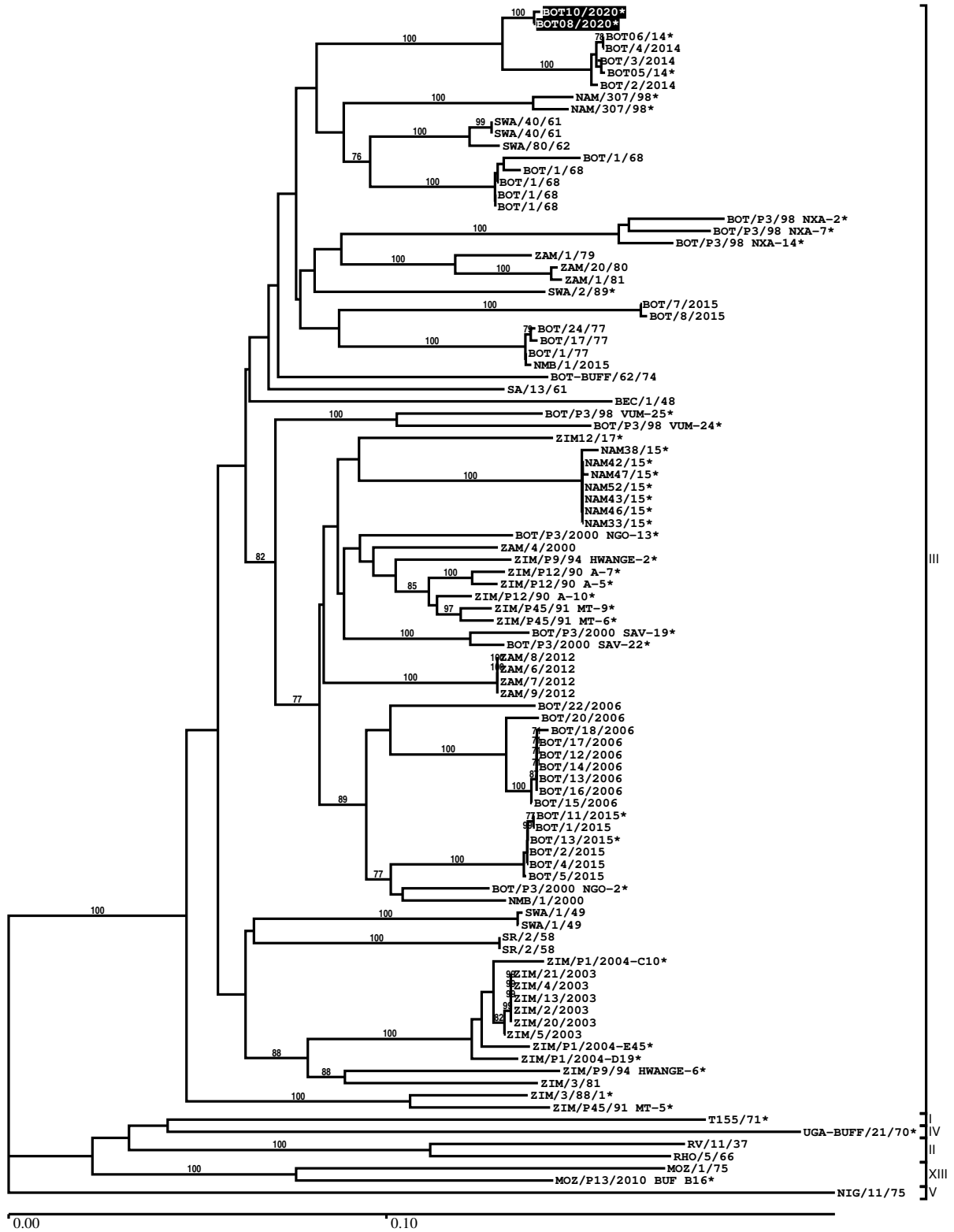
Most Closely Related Prototype Sequences

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

| sequence | virus name | Host | % Id. | # Ambig. | serotype | topotype | lineage | sublineage |
|------------|----------------------|-----------------|-------|----------|----------|----------|---------|------------|
| viba_509 | BOT/1/77 | bovine | 89.0 | 0 | SAT1 | III | | |
| viba_495 | BOT/1/68 | bovine | 88.7 | 0 | SAT1 | III | | |
| viba_212 | BEC/1/48 | | 85.4 | 0 | SAT1 | III | | |
| viba_16635 | MOZ/P13/2010 BUF B16 | African buffalo | 78.0 | 0 | SAT1 | XIII | | |
| viba_462 | RV/11/37 | greater kudu | 76.9 | 0 | SAT1 | II | | |
| viba_30769 | MOZ/1/75 | cattle | 76.8 | 0 | SAT1 | XIII | | |
| viba_709 | RHO/5/66 | bovine | 76.3 | 0 | SAT1 | II | | |
| viba_466 | T155/71 | cattle | 75.5 | 0 | SAT1 | I | | |
| viba_514 | UGA-BUFF/21/70 | African buffalo | 74.3 | 0 | SAT1 | IV | | |
| viba_446 | NIG/11/75 | bovine | 72.4 | 0 | SAT1 | V | | |

Report on FMDV SAT1 in Botswana in 2020

Batch: WRLMEG/2020/00027



*, not a WRLFMD Reference Number

Analysis Parameters

| | |
|--|---|
| VP1 subsequence extractor: | vp1_SAT1 |
| Query sequence set: | WRLMEG/2020/00027-Botswana-SAT1 (2 sequences) |
| Sequence database set: | allseqs_SAT1 (719 sequences) |
| Prototype sequence set: | !prototypes_SAT1 (19 sequences) |
| Number of related sequences reported: | 10 |
| Minimal VP1 subsequence match length | 600 |
| Sequence alignment method: | muscle (default parameters) |
| Sequence alignment length: | 654 |
| 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/SAT1

| label | accession | host(s) | lab | country | taxonomic information |
|-------------------|-----------|-----------------|----------|-------------------------------|-----------------------|
| BOT10/2020* | n/a | bovine | BVI | Botswana | III |
| BOT08/2020* | n/a | bovine | BVI | Botswana | III |
| BOT06/14* | n/a | cattle | BVI | Botswana | III |
| BOT/4/2014 | n/a | bovine | WRLFMD | Botswana | III |
| BOT/3/2014 | n/a | bovine | WRLFMD | Botswana | III |
| BOT05/14* | n/a | cattle | BVI | Botswana | III |
| BOT/2/2014 | n/a | bovine | WRLFMD | Botswana | III |
| NAM/307/98* | DQ009717 | African buffalo | OVI | Namibia | III |
| NAM/307/98* | AY770519 | African buffalo | OVI | (NAM) Namibia | III |
| SWA/40/61 | n/a | n/a | WRLFMD | (NAM) South West Africa | III |
| SWA/40/61 | AY593843 | n/a | PIADC | South West Africa | III |
| SWA/80/62 | n/a | n/a | WRLFMD | South West Africa | III |
| BOT/1/68 | n/a | bovine | Wellcome | Botswana | III |
| BOT/1/68 | Z98203 | bovine | WRLFMD | Botswana | III |
| BOT/1/68 | n/a | bovine | WRLFMD | Botswana | III |
| BOT/1/68 | AY593845 | bovine | PIADC | Botswana | III |
| BOT/1/68 | EF134950 | bovine | IZSLE | Botswana | III |
| BOT/P3/98 NXA-2* | n/a | African buffalo | WRLFMD | Botswana | III |
| BOT/P3/98 NXA-7* | n/a | African buffalo | WRLFMD | Botswana | III |
| BOT/P3/98 NXA-14* | n/a | African buffalo | WRLFMD | Botswana | III |
| ZAM/1/79 | n/a | n/a | WRLFMD | Zambia | III |
| ZAM/20/80 | n/a | cattle | WRLFMD | Zambia | III |
| ZAM/1/81 | n/a | cattle | WRLFMD | Zambia | III |
| SWA/2/89* | n/a | African buffalo | WRLFMD | South West Africa | III |
| BOT/7/2015 | n/a | bovine | WRLFMD | Botswana | III |
| BOT/8/2015 | n/a | bovine | WRLFMD | Botswana | III |
| BOT/24/77 | KF219688 | n/a | WRLFMD | Botswana | III |
| BOT/17/77 | KF219687 | greater kudu | WRLFMD | Botswana | III |
| BOT/1/77 | KF219686 | bovine | WRLFMD | Botswana | III |
| NMB/1/2015 | n/a | bovine | WRLFMD | Namibia | III |
| BOT-BUFF/62/74 | n/a | African buffalo | WRLFMD | Botswana | III |

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| label | accession | host(s) | lab | country | taxonomic information |
|---------------------|-----------|-----------------|--------|----------------------|-----------------------|
| SA/13/61 | AY593842 | cattle | PIADC | South Africa | III |
| BEC/1/48 | AY593838 | n/a | PIADC | (SA) Bechuanaland | III |
| BOT/P3/98 VUM-25* | n/a | African buffalo | WRLFMD | Botswana | III |
| BOT/P3/98 VUM-24* | n/a | African buffalo | WRLFMD | Botswana | III |
| ZIM12/17* | n/a | bovine | BVI | Zimbabwe | III |
| NAM38/15* | n/a | cattle | BVI | Namibia | III |
| NAM42/15* | n/a | cattle | BVI | (NAM) Namibia | III |
| NAM47/15* | n/a | cattle | BVI | (NAM) Namibia | III |
| NAM52/15* | n/a | cattle | BVI | (NAM) Namibia | III |
| NAM43/15* | n/a | cattle | BVI | (NAM) Namibia | III |
| NAM46/15* | n/a | cattle | BVI | (NAM) Namibia | III |
| NAM33/15* | n/a | cattle | BVI | (NAM) Namibia | III |
| BOT/P3/2000 NGO-13* | n/a | African buffalo | WRLFMD | Botswana | III |
| ZAM/4/2000 | n/a | bovine | WRLFMD | Zambia | III |
| ZIM/P9/94 HWANGE-2* | n/a | African buffalo | WRLFMD | Zimbabwe | III |
| ZIM/P12/90 A-7* | n/a | African buffalo | WRLFMD | Zimbabwe | III |
| ZIM/P12/90 A-5* | n/a | African buffalo | WRLFMD | Zimbabwe | III |
| ZIM/P12/90 A-10* | n/a | African buffalo | WRLFMD | Zimbabwe | III |
| ZIM/P45/91 MT-9* | n/a | African buffalo | WRLFMD | Zimbabwe | III |
| ZIM/P45/91 MT-6* | n/a | African buffalo | WRLFMD | Zimbabwe | III |
| BOT/P3/2000 SAV-19* | n/a | African buffalo | WRLFMD | Botswana | III |
| BOT/P3/2000 SAV-22* | n/a | African buffalo | WRLFMD | Botswana | III |
| ZAM/8/2012 | n/a | bovine | WRLFMD | Zambia | III |
| ZAM/6/2012 | n/a | bovine | WRLFMD | Zambia | III |
| ZAM/7/2012 | n/a | bovine | WRLFMD | Zambia | III |
| ZAM/9/2012 | n/a | bovine | WRLFMD | Zambia | III |
| BOT/22/2006 | n/a | African buffalo | WRLFMD | Botswana | III |
| BOT/20/2006 | n/a | African buffalo | WRLFMD | Botswana | III |
| BOT/18/2006 | n/a | cattle | WRLFMD | Botswana | III |
| BOT/17/2006 | n/a | cattle | WRLFMD | Botswana | III |
| BOT/12/2006 | n/a | cattle | WRLFMD | Botswana | III |
| BOT/14/2006 | n/a | cattle | WRLFMD | Botswana | III |
| BOT/13/2006 | n/a | cattle | WRLFMD | Botswana | III |
| BOT/16/2006 | n/a | cattle | WRLFMD | Botswana | III |
| BOT/15/2006 | n/a | cattle | WRLFMD | Botswana | III |
| BOT/11/2015* | n/a | cattle | BVI | Botswana | III |
| BOT/1/2015 | n/a | bovine | WRLFMD | Botswana | III |
| BOT/13/2015* | n/a | cattle | BVI | Botswana | III |
| BOT/2/2015 | n/a | bovine | WRLFMD | Botswana | III |
| BOT/4/2015 | n/a | bovine | WRLFMD | Botswana | III |
| BOT/5/2015 | n/a | bovine | WRLFMD | Botswana | III |
| BOT/P3/2000 NGO-2* | n/a | African buffalo | WRLFMD | Botswana | III |
| NMB/1/2000 | n/a | bovine | WRLFMD | Namibia | III |
| SWA/1/49 | AY593840 | n/a | PIADC | South West Africa | III |
| SWA/1/49 | n/a | n/a | WRLFMD | South West Africa | III |
| SR/2/58 | AY593841 | n/a | PIADC | Rhodesia (SR) | III |
| SR/2/58 | n/a | n/a | WRLFMD | Rhodesia (SR) | III |
| ZIM/P1/2004-C10* | n/a | cattle | WRLFMD | Zimbabwe | III |
| ZIM/21/2003 | n/a | n/a | WRLFMD | Zimbabwe | III |
| ZIM/4/2003 | n/a | n/a | WRLFMD | Zimbabwe | III |
| ZIM/13/2003 | n/a | n/a | WRLFMD | Zimbabwe | III |
| ZIM/2/2003 | n/a | n/a | WRLFMD | Zimbabwe | III |
| ZIM/20/2003 | n/a | n/a | WRLFMD | Zimbabwe | III |
| ZIM/5/2003 | n/a | n/a | WRLFMD | Zimbabwe | III |
| ZIM/P1/2004-E45* | n/a | cattle | WRLFMD | Zimbabwe | III |
| ZIM/P1/2004-D19* | n/a | cattle | WRLFMD | Zimbabwe | III |
| ZIM/P9/94 HWANGE-6* | n/a | African buffalo | WRLFMD | Zimbabwe | III |

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| label | accession | host(s) | lab | country | taxonomic information |
|-----------------------|-----------|-----------------|--------|---------------|-----------------------|
| ZIM/3/81 | n/a | cattle | WRLFMD | Zimbabwe | III |
| ZIM/3/88/1* | n/a | African buffalo | WRLFMD | Zimbabwe | III |
| ZIM/P45/91 MT-5* | n/a | African buffalo | WRLFMD | Zimbabwe | III |
| T155/71* | KF561706 | cattle | WRLFMD | Tanzania | I |
| UGA-BUFF/21/70* | KF219682 | African buffalo | WRLFMD | Uganda | IV |
| RV/11/37 | AY593839 | greater kudu | PIADC | Rhodesia (RV) | II |
| RHO/5/66 | AY593846 | bovine | PIADC | Rhodesia | II |
| MOZ/1/75 | MG972461 | cattle | WRLFMD | Mozambique | XIII |
| MOZ/P13/2010 BUF B16* | KF219691 | African buffalo | WRLFMD | Mozambique | XIII |
| NIG/11/75 | AF431711 | bovine | OVI | Nigeria | V |

*, not a WRLFMD Reference Number

n/a, not available