

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

Genotyping Report v.2

FMDV serotype: O
Country: Zambia
Year: 2018
Batch: WRLMEG/2018/00020
No. of sequences: 2
Report date: 22nd April 2018
Report generated by: Nick Knowles
Report checked by: Kasia Bankowska

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 16 April 2018.



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

email: reporting@pirbright.ac.uk

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| | |
|---|--------------------|
| Virus sample name: | ZAM10/2018 |
| Sender reference: | O/ZAM10/2018 |
| Location of origin: | Northern |
| Country of origin: | Zambia |
| Date of collection: | 27/03/2018 |
| Host species: | bovine |
| Serotype: | O |
| Topotype: | EA-2 |
| Lineage: | |
| Sublineage: | |
| Sequence length: | 633 |
| Ambiguities: | 0 |
| Material submitted for sequencing: | epithelial tissue |
| Harvest date of material: | n/a |
| Primers: | O-1C272F/EUR-2B52R |
| Received for sequencing: | n/a |
| Created: | 17/04/2018 |
| Last updated: | 17/04/2018 |
| VIBASys IDs: sample 36341, genome 36342, sequence viba_36343, sequencing info 36344 | |

Most Closely Related Sequences

| sequence | virus name | Host | % Id. | # Ambig. | serotype | topotype | lineage | sublineage |
|------------|-------------------|--------|-------|----------|----------|----------|---------|------------|
| viba_36347 | ZAM12/2018 | bovine | 100.0 | 0 | O | EA-2 | | |
| viba_33182 | TAN-CVL-2012-0321 | bovine | 96.4 | 0 | O | EA-2 | | |
| viba_33178 | TAN-CVL-2012-0318 | bovine | 96.2 | 0 | O | EA-2 | | |
| viba_22016 | TAN-CVL-2013-0364 | cattle | 95.7 | 0 | O | EA-2 | | |
| viba_22020 | TAN-CVL-2013-0366 | cattle | 95.6 | 0 | O | EA-2 | | |
| viba_22012 | TAN-CVL-2013-0362 | cattle | 95.6 | 0 | O | EA-2 | | |
| viba_33174 | TAN-CVL-2011-0106 | cattle | 95.4 | 0 | O | EA-2 | | |
| viba_14483 | COD/2/2010 | cattle | 95.3 | 0 | O | EA-2 | | |
| viba_14479 | COD/1/2010 | cattle | 95.3 | 0 | O | EA-2 | | |
| viba_14491 | COD/4/2010 | cattle | 95.1 | 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 | 89.3 | 0 | O | EA-2 | | |
| viba_221 | MAL/1/98 | | 85.9 | 0 | O | EA-2 | | |
| viba_263 | TAN/2/2004 | bovine | 85.6 | 0 | O | EA-2 | | |
| viba_354 | PAK/16/2010 | cattle | 83.7 | 0 | O | ME-SA | PanAsia-2 | PUN-10 |
| viba_541 | OMN/7/2001 | bovine | 83.3 | 0 | O | ME-SA | Ind-2001 | b |
| viba_719 | IRN/88/2009 | | 83.2 | 0 | O | ME-SA | PanAsia-2 | ANT-10 |
| viba_650 | IRN/8/2005 | ovine | 83.2 | 0 | O | ME-SA | PanAsia-2 | |
| viba_766 | IRN/31/2009 | cattle | 83.0 | 0 | O | ME-SA | PanAsia-2 | FAR-09 |
| viba_285 | UKG/35/2001 | porcine | 83.0 | 0 | O | ME-SA | PanAsia | |

| | |
|---|--------------------|
| Virus sample name: | ZAM12/2018 |
| Sender reference: | O/ZAM12/2018 |
| Location of origin: | Northern |
| Country of origin: | Zambia |
| Date of collection: | 27/03/2018 |
| Host species: | bovine |
| Serotype: | O |
| Topotype: | EA-2 |
| Lineage: | |
| Sublineage: | |
| Sequence length: | 633 |
| Ambiguities: | 0 |
| Material submitted for sequencing: | epithelial tissue |
| Harvest date of material: | n/a |
| Primers: | O-1C272F/EUR-2B52R |
| Received for sequencing: | n/a |
| Created: | 17/04/2018 |
| Last updated: | 17/04/2018 |
| VIBASys IDs: sample 36345, genome 36346, sequence viba_36347, sequencing info 36348 | |

Most Closely Related Sequences

| sequence | virus name | Host | % Id. | # Ambig. | serotype | topotype | lineage | sublineage |
|------------|-------------------|--------|-------|----------|----------|----------|---------|------------|
| viba_36343 | ZAM10/2018 | bovine | 100.0 | 0 | O | EA-2 | | |
| viba_33182 | TAN-CVL-2012-0321 | bovine | 96.4 | 0 | O | EA-2 | | |
| viba_33178 | TAN-CVL-2012-0318 | bovine | 96.2 | 0 | O | EA-2 | | |
| viba_22016 | TAN-CVL-2013-0364 | cattle | 95.7 | 0 | O | EA-2 | | |
| viba_22020 | TAN-CVL-2013-0366 | cattle | 95.6 | 0 | O | EA-2 | | |
| viba_22012 | TAN-CVL-2013-0362 | cattle | 95.6 | 0 | O | EA-2 | | |
| viba_33174 | TAN-CVL-2011-0106 | cattle | 95.4 | 0 | O | EA-2 | | |
| viba_14483 | COD/2/2010 | cattle | 95.3 | 0 | O | EA-2 | | |
| viba_14479 | COD/1/2010 | cattle | 95.3 | 0 | O | EA-2 | | |
| viba_14491 | COD/4/2010 | cattle | 95.1 | 0 | O | EA-2 | | |

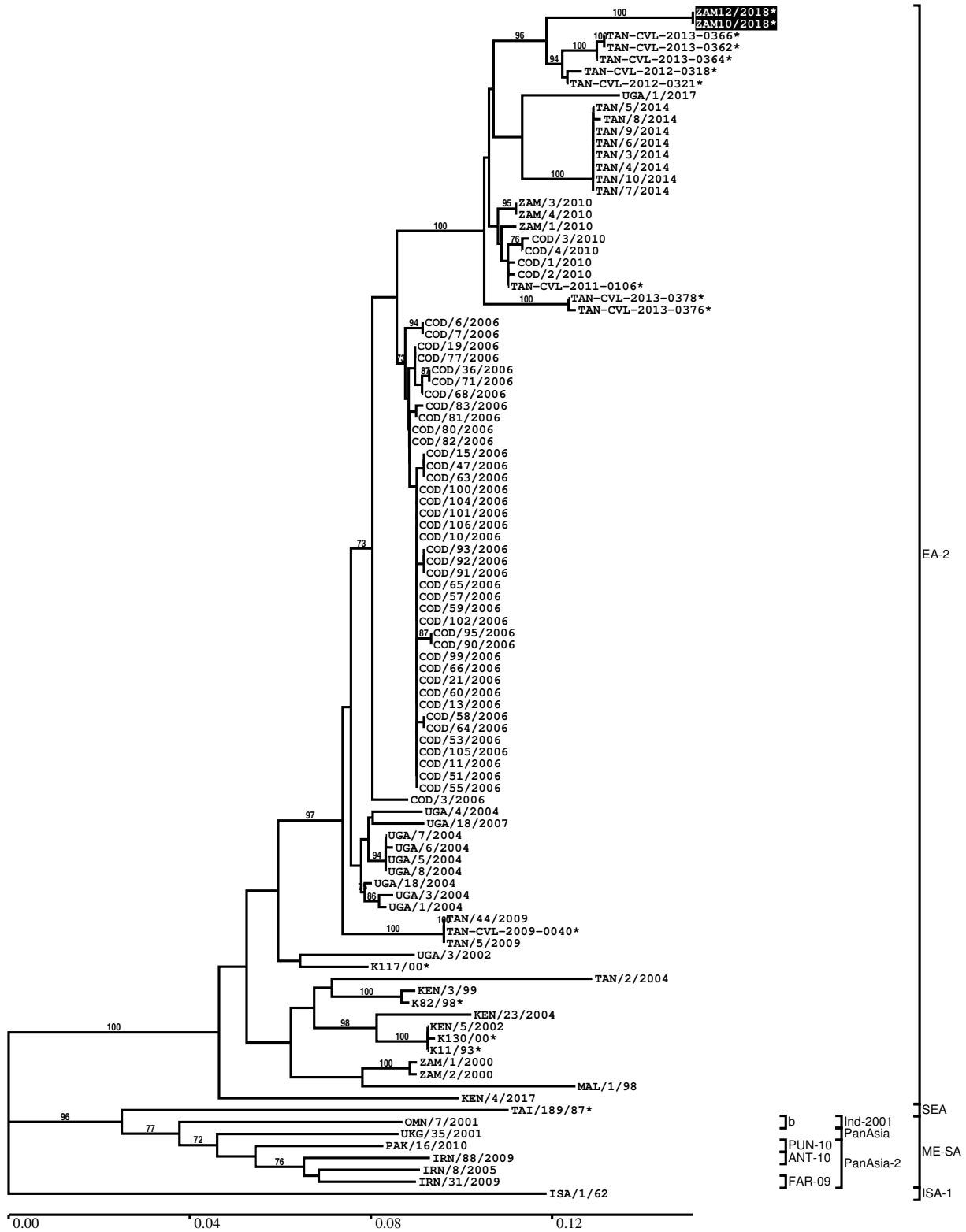
Most Closely Related Prototype Sequences

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 | 89.3 | 0 | O | EA-2 | | |
| viba_221 | MAL/1/98 | | 85.9 | 0 | O | EA-2 | | |
| viba_263 | TAN/2/2004 | bovine | 85.6 | 0 | O | EA-2 | | |
| viba_354 | PAK/16/2010 | cattle | 83.7 | 0 | O | ME-SA | PanAsia-2 | PUN-10 |
| viba_541 | OMN/7/2001 | bovine | 83.3 | 0 | O | ME-SA | Ind-2001 | b |
| viba_719 | IRN/88/2009 | | 83.2 | 0 | O | ME-SA | PanAsia-2 | ANT-10 |
| viba_650 | IRN/8/2005 | ovine | 83.2 | 0 | O | ME-SA | PanAsia-2 | |
| viba_766 | IRN/31/2009 | cattle | 83.0 | 0 | O | ME-SA | PanAsia-2 | FAR-09 |
| viba_285 | UKG/35/2001 | porcine | 83.0 | 0 | O | ME-SA | PanAsia | |

Report on FMDV O in Zambia in 2018

Batch: WRLMEG/2018/00020



*, not a WRLFMD Reference Number

Analysis Parameters

VP1 subsequence extractor: vp1_O
 Query sequence set: WRLMEG/2018/00020-Zambia-O (2 sequences)
 Sequence database set: allseqs_O (3755 sequences)
 Prototype sequence set: !prototypes_O (48 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 |
|--------------------|-----------|---------|---------------|--|-----------------------|
| ZAM12/2018* | n/a | bovine | BVI | Zambia | EA-2 |
| ZAM10/2018* | n/a | bovine | BVI | 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 |
| UGA/1/2017 | n/a | cattle | WRLFMD | Uganda | EA-2 |
| TAN/5/2014 | n/a | bovine | WRLFMD | Tanzania | EA-2 |
| TAN/8/2014 | MF592669 | bovine | WRLFMD | Tanzania | EA-2 |
| TAN/9/2014 | MF592670 | bovine | WRLFMD | Tanzania | EA-2 |
| TAN/6/2014 | MF592667 | bovine | WRLFMD | Tanzania | EA-2 |
| TAN/3/2014 | MF592665 | bovine | WRLFMD | Tanzania | EA-2 |
| TAN/4/2014 | MF592666 | bovine | WRLFMD | Tanzania | EA-2 |
| TAN/10/2014 | MF592671 | bovine | WRLFMD | Tanzania | EA-2 |
| TAN/7/2014 | MF592668 | 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/3/2010 | n/a | cattle | WRLFMD | Democratic Republic of the Congo | EA-2 |
| COD/4/2010 | 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 |
| TAN-CVL-2013-0378* | n/a | cattle | CVL, Tanzania | Tanzania | EA-2 |
| TAN-CVL-2013-0376* | n/a | cattle | CVL, Tanzania | Tanzania | EA-2 |
| COD/6/2006 | n/a | cattle | WRLFMD | Democratic Republic of the Congo | EA-2 |

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| label | accession | host(s) | lab | country | taxonomic information |
|--------------|-----------|---------|--------|----------------------------------|-----------------------|
| COD/7/2006 | 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/36/2006 | 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/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/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 |
| 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/63/2006 | 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/104/2006 | 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/106/2006 | 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/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/91/2006 | 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/57/2006 | n/a | cattle | WRLFMD | Democratic Republic of the Congo | EA-2 |

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| label | accession | host(s) | lab | country | taxonomic information |
|--------------------|-----------|---------|---------------------|----------------------------------|-----------------------|
| COD/59/2006 | 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/95/2006 | n/a | cattle | WRLFMD | Democratic Republic of the Congo | EA-2 |
| COD/90/2006 | 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/66/2006 | 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/60/2006 | 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/58/2006 | 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/53/2006 | 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/11/2006 | 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/55/2006 | n/a | cattle | WRLFMD | Democratic Republic of the Congo | EA-2 |
| COD/3/2006 | n/a | cattle | WRLFMD | Democratic Republic of the Congo | EA-2 |
| UGA/4/2004 | n/a | bovine | WRLFMD | Uganda | EA-2 |
| UGA/18/2007 | n/a | cattle | WRLFMD | Uganda | EA-2 |
| UGA/7/2004 | n/a | bovine | WRLFMD | Uganda | EA-2 |
| UGA/6/2004 | n/a | bovine | WRLFMD | Uganda | EA-2 |
| UGA/5/2004 | n/a | bovine | WRLFMD | Uganda | EA-2 |
| UGA/8/2004 | n/a | bovine | WRLFMD | Uganda | EA-2 |
| UGA/18/2004 | n/a | bovine | WRLFMD | Uganda | EA-2 |
| UGA/3/2004 | n/a | bovine | WRLFMD | Uganda | EA-2 |
| UGA/1/2004 | n/a | bovine | WRLFMD | Uganda | EA-2 |
| TAN/44/2009 | KF561686 | cattle | WRLFMD | Tanzania | EA-2 |
| TAN-CVL-2009-0040* | n/a | bovine | CVL | Tanzania | EA-2 |
| TAN/5/2009 | KF561685 | cattle | WRLFMD | Tanzania | EA-2 |
| UGA/3/2002 | DQ165077 | n/a | WRLFMD | Uganda | EA-2 |
| K117/00* | HM756607 | bovine | Makerere University | Kenya | EA-2 |
| TAN/2/2004 | KF561679 | bovine | WRLFMD | Tanzania | EA-2 |
| KEN/3/99 | n/a | bovine | WRLFMD | Kenya | EA-2 |

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| label | accession | host(s) | lab | country | taxonomic information |
|-------------|-----------|---------|---------------------|----------------|------------------------|
| K82/98* | HM756602 | bovine | Makerere University | Kenya | EA-2 |
| KEN/23/2004 | n/a | cattle | WRLFMD | Kenya | EA-2 |
| KEN/5/2002 | DQ165073 | bovine | WRLFMD | Kenya | EA-2 |
| K130/00* | HM756608 | bovine | Makerere University | Kenya | EA-2 |
| K11/93* | HM756598 | bovine | Makerere University | Kenya | EA-2 |
| ZAM/1/2000 | n/a | bovine | WRLFMD | Zambia | EA-2 |
| ZAM/2/2000 | n/a | bovine | WRLFMD | Zambia | EA-2 |
| MAL/1/98 | DQ165074 | n/a | WRLFMD | Malawi | EA-2 |
| KEN/4/2017 | n/a | cattle | WRLFMD | Kenya | EA-2 |
| TAI/189/87* | KY091288 | bovine | TRRL | Thailand | SEA |
| OMN/7/2001 | DQ164941 | bovine | WRLFMD | Oman | ME-SA/Ind-2001/b |
| UKG/35/2001 | AJ539141 | porcine | PIADC | United Kingdom | ME-SA/PanAsia |
| 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 |
| IRN/31/2009 | KY091284 | cattle | WRLFMD | Iran | ME-SA/PanAsia-2/FAR-09 |
| ISA/1/62 | AJ303500 | n/a | WRLFMD | Indonesia | ISA-1 |

*, not a WRLFMD Reference Number

n/a, not available