**Table S1: Serology and OPF screening from farms in each province in 2015**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Province** | **Serum Tested** | **Serum positive**  | **Seropositive percentage of samples** | **OPF Screened (rRT-PCR)** | **OPF positive for FMDV RNA** | **Percentage OPF positive** |
| Hà Tĩnh | 500 | 86 | 17.2 (13,21) | 112 | 0 | 0 |
| Lạng Sơn | 484 | 20 | 4 (2,5) | 33 | 0 | 0 |
| Phú Thọ | 500 | 50 | 10 (7,12) | 62 | 0 | 0 |
| Bắc Kạn | *na* | *na* | *na* | *na* | *na* | *na* |
| Ninh Thuận | *na* | *na* | *na* | *na* | *na* | *na* |
| Đồng Tháp | 485  | 149  | 31 (26,34) | 139 | 36 | 25.8 |
| Bình Phước | 514  | 84  | 16 (13,19) | 80 | 2 | 2.5 |
| Đăk Lăk | 504  | 142  | 28 (24,32) | 142 | 3 | 2.1 |
| TOTAL | 2,987  | 531  |   | 568  | 41  | 7.2 |

**Table S2: Serology and OPF screening from farms in each province in 2016**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Province** | **Serum Tested** | **Serum positive** | **Seropositive percentage of samples** | **OPF Screened (rRT-PCR)** | **OPF positive** | **Percentage OPF positive** |
| Hà Tĩnh | *na* | *na* | *na* | *na* | *na* | *na* |
| Lạng Sơn | 236 | 31 | 13 (8,17) | 33 | 2 | 6 |
| Phú Thọ | 253 | 34 | 13 (9,17) | 32 | 2 | 6.2 |
| Bắc Kạn | 496 | 167 | 34 (29,37) | 165 | 32 | 19.4 |
| Ninh Thuận | 250 | 177 | 71 (65,76) | 177 | 20 | 11.2 |
| Đồng Tháp | 254 | 100 | 39 (33,45) | 102 | 33 | 32.3 |
| Bình Phước | *na* | *na* | *na* | *na* | *na* | *na* |
| Đăk Lăk | *na* | *na* | *na* | *na* | *na* | *na* |
| TOTAL | 1,489  | 509  |   | 509  | 89  | 17.4 |

**Table S3: Serology and OPF screening from farms in each province in 2017**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Province** | **Serum****Tested** | **Serum positive** | **Seropositive percentage of samples** | **OPF Screened (rRT-PCR)** | **OPF positive for FMDV RNA** | **Percentage OPF positive** |
| Hà Tĩnh | *na* | *na* | *na* | *na* | *na* | *na* |
| Lạng Sơn | 316 | 92 | 29 (24,34) | 92 | 0 | 0 |
| Phú Thọ | 177 | 82 | 46 (39,53) | 77 | 0 | 0 |
| Bắc Kạn | 982 | 447 | 46 (42,48) | 443 | 33 | 7.4 |
| Ninh Thuận | 585 | 467 | 80 (76,83) | 461 | 49 | 10.6 |
| Đồng Tháp | 369 | 210 | 57 (51,61) | 212 | 85 | 40 |
| Bình Phước | *na* | *na* | *na* | *na* | *na* | *na* |
| Đăk Lăk | 252  | 182  | 72 (66,77) | 181 | 56 | 31 |
| TOTAL | 2,681  | 1,480  |   | 1,466  | 223  |  |

**Table S4: Serology and OPF screening from farms in each province in 2018**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Province** | **Serum****Tested** | **Serum positive** | **Seropositive percentage of samples** | **OPF Screened (rRT-PCR)** | **OPF positive for FMDV RNA** | **Percentage OPF positive** |
| Hà Tĩnh | *na* | *na* | *na* | *na* | *na* | *na* |
| Lạng Sơn | 351 | 65 | 19 (14,22) | 65 | 1 | 1.53 |
| Phú Thọ | 149 | 48 | 32 (24,39) | 48 | 0 | 0 |
| Bắc Kạn | 752 | 363 | 48 (44,51) | 347 | 3 | 0.8 |
| Ninh Thuận | 319 | 257 | 81 (76,84) | 256 | 3 | 1.1 |
| Đồng Tháp | 540 | 284 | 53 (48,56) | 284 | 31 | 11 |
| Bình Phước | *na* | *na* | *na* | *na* | *na* | *na* |
| Đăk Lăk | 942  | 605  | 64 (61,67) | 605 | 27 | 4.4 |
| TOTAL | 3,053  | 1,622  |   | 1,605  | 65  |  |

**Table S5: Serology and OPF screening from farms in each province in 2019**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Province** | **Serum****Tested** | **Serum positive** | **Seropositive percentage of samples** | **OPF Screened (rRT-PCR)** | **OPF positive for FMDV RNA** | **Percentage OPF positive** |
| Hà Tĩnh | *na* | *na* | *na* | *na* | *na* | *na* |
| Lạng Sơn | *na* | *na* | *na* | *na* | *na* | *na* |
| Phú Thọ | 117 | 55 | 47 (38,56) | 55 | 0 | 0 |
| Bắc Kạn | 560 | 287 | 51 (47,55) | 286 | 5 | 1.74 |
| Ninh Thuận | 136 | 109 | 80 (73,86) | 109 | 0 | 0 |
| Đồng Tháp | 317 | 145 | 46 (40,51) | 145 | 12 | 8.27 |
| Bình Phước | *na* | *na* | *na* | *na* | *na* | *na* |
| Đăk Lăk | 475  | 304  | 64 (59,68) | 302 | 11 | 3.64 |
| TOTAL | 1,605  | 900  |   | 897  | 28  |  |

**Table S6: Slaughterhouse Serology and OPF sample collection summary Long An**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sampling Round** | **Serum****Tested** | **Number of positive 3ABC** | **Percentage 3ABC ELISA positive**  | **OPF Screened (rRT-PCR)** | **OPF positive for FMDV RNA** | **Percentage OPF positive** |
| 1 | 30 | 21 | 70.0 (56,86) | 30 | 7 | 23.3 |
| 2 | 30 | 10 | 33.3 (16.5, 50) | 30 | 2 | 6.6 |
| 3 | 28 | 4 | 14.3 (1.3,27) | 28 | 0 | 0 |
| 4 | 30 | 11 | 36.7 (19,53) | 30 | 1 | 3.3 |
| 5 | 32 | 15 | 46.9 (29,64) | 32 | 4 | 12.5 |
| 6 | 30 | 10 | 33.3 (16.5,50) | 30 | 4 | 13.3 |
| 7 | 30 | 7 | 23.3 (8.2, 38) | 30 | 4 | 13.3 |
| 8 | 30 | 11 | 36.7 (19.5,53) | 30 | 3 | 10 |
| 9 | 30 | 10 | 33.3 (16.5, 50) | 30 | 4 | 13.3 |
| 10 | 24 | 13 | 54.2 (34.3, 74) | 24 | 5 | 20.8 |
| 11 | 36 | 17 | 47.2 (31,63) | 36 | 6 | 16.6 |
| 12 | 23 | 9 | 39.1 (19.2,56) | 23 | 0 | 0 |
| 13 | 37 | 11 | 29.7 (15,44) | 37 | 3 | 8.1 |
| 14 | 30 | 9 | 30.0 (13.6,46) | 30 | 1 | 3.3 |
| 15 | 20 | 11 | 55.0 (33,76 ) | 20 | 4 | 20 |
| 16 | 40 | 10 | 25.0 (11,38) | 40 | 3 | 7.5 |
| Grand Total | 480 | 179 | 37.3 | 480 | 51 |  |

**Table S7: Slaughterhouse Serology and OPF sample collection summary Tay Ninh**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sampling Round | SerumTested | Number of positive 3ABC | Percentage 3ABC ELISA positive | OPF Screened (rRT-PCR) | OPF positive for FMDV RNA | Percentage OPF positive |
| 1 | 30 | 28 | 93.3 (84, 100) | 30 | 9 | 30 |
| 2 | 30 | 14 | 46.7 (29,64) | 30 | 6 | 20 |
| 3 | 30 | 21 | 70.0 (53,86) | 30 | 7 | 23.3 |
| 4 | 30 | 10 | 33.3 (16.5,50) | 30 | 5 | 16.6 |
| 5 | 30 | 14 | 46.7 (29,64) | 30 | 7 | 23.3 |
| 6 | 30 | 7 | 23.3 (8,38) | 30 | 1 | 3.3 |
| 7 | 30 | 18 | 60.0 (42,77) | 30 | 5 | 16.6 |
| 8 | 30 | 21 | 70.0 (53,86) | 30 | 4 | 13.3 |
| 9 | 30 | 8 | 26.7 (11,42) | 30 | 5 | 16.6 |
| 10 | 30 | 9 | 30.0 (13,46) | 30 | 1 | 3.3 |
| 11 | 30 | 17 | 56.7 (39,74) | 30 | 7 | 23.3 |
| 12 | 30 | 15 | 50.0 (32,74) | 30 | 2 | 6.6 |
| 13 | 30 | 11 | 36.7 (19.5, 53.8) | 30 | 2 | 6.6 |
| 14 | 30 | 20 | 66.7 (49.8,83) | 30 | 4 | 13.3 |
| 15 | 30 | 13 | 43.3 (25.6, 70) | 30 | 2 | 6.6 |
| 16 | 30 | 23 | 76.7 (61,91) | 30 | 4 | 13.3 |
| Grand Total | 480 | 277 | 57.7 | 480 | 71 |  |

**Table S8: Large cluster information of serotype O**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Type** | **Area** | **Dates detected** | **Species** | **MRCA** | **Number of sequences** | **Closest lineage**  | **Within cluster GD** |
| cluster 1 | Farm | North | 2012-05-09 to  | Cattle, Buffalo | 2010.1 | 20 | O/ME-SA/PANASIA  | 0.034 |
|   |   |   | 2012-10-11 |  | (2001.77, 2028.89) |  |   |  |
|   | Farm | Central | 2012-04-23 |  |  |  |   |  |
|   | Farm and | South  | 2012-04-13 to  |  |  |  |   |  |
|   | Outbreak |   | 2017-01-09\* |  |  |  |   |  |
| cluster 2† | Farm and | North | 2017-10-01 to | Pig, Cattle, Buffalo, Goat | 2016.5 | 73 | O/ME-SA/PANASIA  | 0.011 |
|   | Outbreak |   | 2018-11-11 |  | (2014.4,2018.8) |  |   |  |
|   | Outbreak | Central | 2018-04-13 | Cattle |  |  |   |  |
|   | Farm and | South  | 2017-01-10 to | Cattle, Buffalo |  |  |   |  |
|   | Slaughterhouse |   | 2018-07-01 |  |  |  |   |  |
| cluster 6† | Outbreak | North | 2018-11-13 to  | Pig | 2017.9 | 21 | Mya-98  | 0.021 |
|   |   |   | 2019-01-15 |  | (2017.5, 2019.1) |  |   |  |
|   | Outbreak | Central | 2018-12-27 to |  |  |  |   |  |
|   |   |   | 2019-01-05 |  |  |  |   |  |
|   | Outbreak | South  | 2018-11-13 to  |  |  |  |   |  |
|   |   |   | 2019-01-11 |  |  |  |   |  |
| cluster 8 | Farm and | North | 2010-12-22 to | Pig, Cattle, Buffalo | 2009.5 | 34 | O/ME-SA/PANASIA  | 0.021 |
|   | Outbreak |   | 2014-07-14 |  | (2001.1,2018.9) |  |   |  |
|   | Farm and | Central | 2010-12-26 to | Pig, Buffalo |  |  |   |  |
|   | Outbreak |   | 2012-05-23 |  |  |  |   |  |
|   | Outbreak | South  | 2010-12-21 to | Pig, Cattle, Buffalo |  |  |   |  |
|   |   |   | 2014-07-10 |  |  |  |   |  |
| cluster 9† | Outbreak | North | 2016-01-16 to  |  | 2013.1 | 11 | Mya-98 B | 0.066 |
|   |   |   | 2016-11-18 | Cattle | (2007.2,2019.2) |  |   |  |
|   | Outbreak | Central | 2013-10-07 to | Pig (2016-11-18) |  |  |   |  |
|   |   |   | 2016-10-14 |  |  |  |   |  |
|   | Farm and | South  | 2016-08-18 to  |  |  |  |   |  |
|   | Slaughterhouse |   | 2017-12-15 |  |  |  |   |  |
| cluster 10† | Outbreak | North | 2016-11-16 | CattlePig (2015-09-10) | 2016.2 | 16 | O/ME-SA/PANASIA  | 0.027 |
|   | Farm, Outbreak and | South  | 2015-09-10 to  |  | (2014.1,2019.6) |  |   |  |
|   | Slaughterhouse |   | 2017-08-01 |  |  |   |   |   |

† Clusters that were circulating in southern Vietnam during period of slaughterhouse sampling

\* 2017 sequence does not cluster with other sequences in cluster 1, thus this cluster was not considered to be circulating after 2012.

**Table S9: Large cluster information for serotype A**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Type** | **Area** | **Dates detected** | **Species** | **MRCA** | **Number of sequences** | **Closest lineage** | **Within cluster GD** |
| cluster9 | Farm  | North  | 2017-08-25 to  | Cattle | 2015.3 | 56 | SEA/97  | 0.01 |
|   |   |   | 2018-01-08 |  | (2012.2, 2019.5) |  |   |  |
|   | Farm and outbreak | Central | 2017-01-08 to  |  |  |  |   |  |
|   |   |   | 2019-01-05 |  |  |  |   |  |
| cluster5† | Outbreak | North  | 2017-08-29 to  | Cattle | 2015.8 | 20 | SEA/97  | 0.01 |
|   |   |   | 2017-09-11 |  | (2013.1,2019.5) |  |   |  |
|   | Farm and outbreak | Central | 2017-01-08 to  |  |  |  |   |  |
|   |   |   | 2017-08-05 |  |  |  |   |  |
|   | Slaughterhouse | South | 2017-10-17 to |  |  |  |   |  |
|   |   |  | 2018-03-29 |  |  |  |   |  |
| cluster4† | Outbreak | North  | 2013-12-01 to | CattlePig (2014-04-24) | 2012.4 | 21 | SEA/97 | 0.02 |
|   |   |   | 2014-04-24 |  | (2006.4,2019.4) |  |   |  |
|   | Outbreak | Central | 2013-10-09 to  | CattlePig (2015-09-10) |  |  |   |  |
|   |   |   | 2016-10-13 |  |  |  |   |  |
|   | Outbreak and  | South | 2017-10-31 to | Buffalo |  |  |   |  |
|   | Slaughterhouse |   | 2019-06-01 |  |  |  |   |  |
| cluster10† | Farm | South | 2017-01-06 to  |  | 2016.8 | 12 | SEA/97 | 0.04 |
|   |   |   | 2019-06-01 | Cattle | (2015.5,2020.1) |  |   |  |
|   | Slaughterhouse |   | 2018-01-24 to |  |  |   |   |  |
|   |   |   | 2019-02-27 |  |   |   |   |  |

† Clusters that were circulating in southern Vietnam during period of slaughterhouse sampling

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**Figure S1: Serotype O clusters with other sequences from South East Asian countries Cambodia, Laos, Malaysia, Thailand.**

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**Figure S2: Serotype A clusters with other sequences from South East Asian countries Cambodia, Laos, Malaysia, Thailand.**