



WRLFMD Quarterly Report April to June 2015

Reference Laboratory Contract Report

Foot-and-Mouth Disease



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1. Global Summary

1.1. Africa

Algeria

Twelve outbreaks of FMD type O were reported in March and April 2015. Sequence analysis undertaken by IZSLER demonstrates that the causative virus belongs to the O/ME-SA/Ind2001 lineage and is very closely related to FMD viruses recovered from Tunisia and Algeria during 2014.

Angola

An outbreak of FMD type SAT 2 has been reported in cattle at Ombalela, Bondo-Caila, Cuangar, Cunado Cubango (close to the border with Namibia) in May 2015.

Botswana

Two further outbreaks of FMD type SAT 2 have been reported in cattle in Ngamiland in March and April 2015. A third outbreak (as yet untyped) was reported in Kobongo Ntema Crush, Chobe west, Chobe, Chobe on the border with Namibia's Caprivi Strip. Genotyping on both outbreak viruses is awaited from the BVI.

Ethiopia

FMDV types O (EA-3) and SAT 2 (topotype VII) were isolated from samples collected from cattle between November 2014 and March 2015.

Mauritania

FMDV type SAT 2 (topotype VII) was isolated from four of five samples collected from cattle in December 2014 at Tarringuel, Boudami Kerkedaye, M'Bout, Kaedi near to the border with Senegal. This is the first report of FMD in Mauritania since type A was isolated in 2006.

Mozambique

Two outbreaks of FMD type SAT 2 were reported in cattle in Maputo and Gaza in May and June, respectively. Samples have been submitted to the BVI and genotyping is awaited.

Namibia

Seventeen outbreaks of FMD type SAT 2 have been reported in May and June 2015 along the border area with Angola. Samples have been submitted to the BVI and genotyping is awaited.

Zimbabwe

Three sets of outbreaks have been reported. One is in the Matabeleland South/Matabeleland North area involving 10 locations and has not yet been typed. The second included 29 locations (April to June 2015) in Midlands, Matabeleland South, Masvingo and Manicaland and has been typed as FMDV SAT 2. The third involved three locations close to the Chirisa Game Park (Midlands) in June 2015 and remains to be typed.



1.2. Asia

Afghanistan

Twenty one samples were received on the 31/03/2015. FMDV types O (ME-SA/PanAsia-2^{ANT-10}) and Asia 1 (ASIA/Sindh-08) were isolated and genotyped. Two samples were mixtures of types O and Asia 1.

Bahrain

FMDV type O (ME-SA/Ind-2001d) was detected in nine samples from cattle and sheep collected in February and March 2015.

P.R. China

FMDV type A (ASIA/Sea-97 G2) was reported in pigs in Gonggan, Jingzhou , Hubei in May 2015.

Hong Kong SAR, P.R. China

FMDV type O (CATHAY) was isolated from two or four samples collected from pig in April 2015.

Mongolia

FMDV type O (SEA/Mya-98) was isolated from four samples collected from cattle in April 2015.

Oman

FMDV type SAT 2 (topotype VII) was isolated from three of four samples collected from cattle in Rumais, Muscat in April 2015. This is the first report of SAT 2 in Oman.

Pakistan

Thirty two samples were received on 24/02/2015 which had been collected from cattle and water buffalo between 18/01/2014 and 09/02/2015. FMDV types O (ME-SA/PanAsia-2^{ANT-10}), A (ASIA/Iran-05^{FAR-09} and ^{FAR-11}) and Asia 1 (ASIA/Sindh-08) were identified. Three samples were mixtures of type O and type A and one was a mixture of type O and type Asia 1.

Republic of Korea (South Korea)

FMDV type O (SEA/Mya-98) continues to cause problems in South Korea with 64 outbreaks being reported in March and April 2015.

Taiwan POC

FMDV type A was detected in sub-clinically infected cattle on Kinmen Island in May 2015. Genotyping at the NVRI (Taiwan) showed the virus to belong to topotype ASIA lineage Sea-97



1.3. South America

No outbreaks reported

Uncharacterised FMD viruses

A number of outbreaks have occurred where samples have not been sent to the WRLFMD. It is probable that the countries involved have performed their own genetic characterisation; however, through the OIE/FAO Laboratory Network we would also like to encourage the submission of samples (or complete VP1 sequences) to the WRLFMD.



2. Summary of samples

Summary of samples collected and received by WRLFMD® (April to June 2015)

Country	Nº of samples	Virus isolation in cell culture/ELISA								rRT-PCR for FMD (or SVD) virus (where appropriate)	
		FMD virus serotypes							NVD		
		O	A	C	SAT 1	SAT 2	SAT 3	Asia 1		Positive	Negative
BAHRAIN	15	9	-	-	-	0	-	-	6	10	5
ETHIOPIA	10	3	-	-	1	4	-	-	3	10	-
HONG KONG, SAR OF PRC	4	2	-	-	-	-	-	-	2	4	-
MAURITANIA	5	-	-	-	-	4*	-	-	1*	4*	1*
MONGOLIA	4	4	-	-	-	-	-	-	-	4	-
OMAN	4	-	-	-	-	3	-	-	1	4	-
TAIWAN	6	-	-	-	-	-	-	-	6	-	6
TANZANIA	41	8	-	-	29	-	-	-	4	40	1
TOTAL	110	37	-	-	30	11	-	3	32	97	13

* All five samples received from Mauritania were positive for FMD. Three were positive by VI and RT-PCR, one was positive by VI only and one was positive by RT-PCR only

Sample results pending from previous report:

AFGHANISTAN	21	11	-	-	-	-	-	3	9	21	-
TOTAL	21	11	-	-	-	-	-	3	9	21	-

Abbreviations used in table:

VI / ELISA	FMD (or SVD) virus serotype identified following virus isolation in cell culture and antigen detection ELISA
FMD	foot-and-mouth disease
SVD	swine vesicular disease
NVD	no FMD, SVD or vesicular stomatitis virus detected
NT	not tested
rRT-PCR	Real-time reverse transcription polymerase chain reaction for FMD (or SVD) viral genome



3. Virology Results

Detailed virology results for clinical samples tested by the WRLFMD® (April to June 2015)

Country	WRL for FMD Sample Identification	Species	Date of Collection	Results		
				VI / ELISA	rRT-PCR	Final report
BAHRAIN	BAR 1/2015	CATTLE	26-Feb-15	NEG	POS	FMDV GD
	BAR 2/2015	CATTLE	26-Feb-15	O	POS	O
	BAR 3/2015	CATTLE	05-Mar-15	O	POS	O
	BAR 4/2015	CATTLE	05-Mar-15	O	POS	O
	BAR 5/2015	CATTLE	08-Mar-15	O	POS	O
	BAR 6/2015	SHEEP	16-Mar-15	NEG	NEG	NVD
	BAR 7/2015	SHEEP	16-Mar-15	NEG	NEG	NVD
	BAR 8/2015	SHEEP	16-Mar-15	O	POS	O
	BAR 9/2015	SHEEP	16-Mar-15	NEG	NEG	NVD
	BAR 10/2015	SHEEP	16-Mar-15	NEG	NEG	NVD
	BAR 11/2015	SHEEP	16-Mar-15	NEG	NEG	NVD
	BAR 12/2015	SHEEP	16-Mar-15	O	POS	O
	BAR 13/2015	CALF	18-Mar-15	O	POS	O
	BAR 14/2015	CALF	18-Mar-15	O	POS	O
	BAR 15/2015	CALF	18-Mar-15	O	POS	O
ETHIOPIA	ETH 19/2014	BOVINE	27-Nov-14	SAT 2	POS	SAT 2
	ETH 20/2014	BOVINE	31-Dec-14	NEG	POS	FMDV GD
	ETH 21/2014	BOVINE	31-Dec-14	SAT 2	POS	SAT 2
	ETH 22/2014	BOVINE	31-Dec-14	SAT 2	POS	SAT 2
	ETH 1/2015	BOVINE	01-Jan-15	NEG	POS	FMDV GD
	ETH 2/2015	BOVINE	11-Mar-15	SAT 2	POS	SAT 2
	ETH 3/2015	BOVINE	13-Mar-15	O	POS	O
	ETH 4/2015	BOVINE	13-Mar-15	O	POS	O
	ETH 5/2015	BOVINE	13-Mar-15	NEG	POS	FMDV GD
	ETH 6/2015	BOVINE	18-Mar-15	SAT 1, O	POS	SAT 1, O
HONG KONG, SAR OF PRC	HKN 1/2015	PIG	27-Apr-15	O	POS	O
	HKN 2/2015	PIG	28-Apr-15	O	POS	O
	HKN 3/2015	PIG	28-Apr-15	NEG	POS	FMDV GD
	HKN 4/2015	PIG	28-Apr-15	NEG	POS	FMDV GD
MAURITANIA	MAU 1/2014	CATTLE	30-Dec-14	SAT 2	POS	SAT 2
	MAU 2/2014	CATTLE	30-Dec-14	SAT 2	POS	SAT 2
	MAU 3/2014	CATTLE	30-Dec-14	SAT 2	NEG	SAT 2
	MAU 4/2014	CATTLE	30-Dec-14	NEG	POS	FMDV GD
	MAU 5/2014	CATTLE	30-Dec-14	SAT 2	POS	SAT 2
MONGOLIA	MOG 1/2015	CATTLE	28-Feb-15	O	POS	O
	MOG 2/2015	CATTLE	28-Feb-15	O	POS	O
	MOG 3/2015	CATTLE	28-Feb-15	O	POS	O
	MOG 4/2015	CATTLE	28-Feb-15	O	POS	O
OMAN	OMN 1/2015	CATTLE	23-Apr-15	NEG	POS	FMDV GD
	OMN 2/2015	CATTLE	23-Apr-15	SAT 2	POS	SAT 2
	OMN 3/2015	CATTLE	23-Apr-15	SAT 2	POS	SAT 2
	OMN 4/2015	CATTLE	23-Apr-15	SAT 2	POS	SAT 2
TAIWAN	TAW 1/2014	CATTLE	02-May-15	NEG	NEG	NVD
	TAW 2/2015	CATTLE	23-Apr-15	NEG	NEG	NVD
	TAW 3/2015	CATTLE	23-Apr-15	NEG	NEG	NVD
	TAW 4/2015	CATTLE	09-May-15	NEG	NEG	NVD
	TAW 5/2015	CATTLE	09-May-15	NEG	NEG	NVD
	TAW 6/2015	CATTLE	09-May-15	NEG	NEG	NVD



Country	WRL for FMD Sample Identification	Species	Date of Collection	Results		
				VI / ELISA	rRT-PCR	Final report
TANZANIA	TAN 1/2014	BOVINE	20-May-14	NEG	POS	FMDV GD
	TAN 2/2014	BOVINE	20-May-14	NEG	POS	FMDV GD
	TAN 3/2014	BOVINE	24-May-14	O	POS	O
	TAN 4/2014	BOVINE	24-May-14	O	POS	O
	TAN 5/2014	BOVINE	24-May-14	O	POS	O
	TAN 6/2014	BOVINE	24-May-14	O	POS	O
	TAN 7/2014	BOVINE	25-May-14	O	POS	O
	TAN 8/2014	BOVINE	25-May-14	O	POS	O
	TAN 9/2014	BOVINE	25-May-14	O	POS	O
	TAN 10/2014	BOVINE	25-May-14	O	POS	O
	TAN 11/2014	BOVINE	18-Aug-14	SAT 1	POS	SAT 1
	TAN 12/2014	BOVINE	18-Aug-14	SAT 1	POS	SAT 1
	TAN 13/2014	BOVINE	24-Aug-14	SAT 1	POS	SAT 1
	TAN 14/2014	BOVINE	24-Aug-14	SAT 1	POS	SAT 1
	TAN 15/2014	BOVINE	24-Aug-14	SAT 1	POS	SAT 1
	TAN 16/2014	BOVINE	24-Aug-14	SAT 1	POS	SAT 1
	TAN 17/2014	BOVINE	02-Sep-14	SAT 1	POS	SAT 1
	TAN 18/2014	BOVINE	02-Sep-14	SAT 1	POS	SAT 1
	TAN 19/2014	BOVINE	03-Sep-14	SAT 1	POS	SAT 1
	TAN 20/2014	BOVINE	03-Sep-14	SAT 1	POS	SAT 1
	TAN 21/2014	BOVINE	09-Sep-14	SAT 1	POS	SAT 1
	TAN 22/2014	BOVINE	09-Sep-14	SAT 1	POS	SAT 1
	TAN 23/2014	BOVINE	09-Sep-14	SAT 1	POS	SAT 1
	TAN 24/2014	BOVINE	09-Sep-14	SAT 1	POS	SAT 1
	TAN 25/2014	BOVINE	09-Sep-14	SAT 1	POS	SAT 1
	TAN 26/2014	BOVINE	09-Sep-14	SAT 1	POS	SAT 1
	TAN 27/2014	BOVINE	09-Sep-14	SAT 1	POS	SAT 1
	TAN 28/2014	BOVINE	09-Sep-14	SAT 1	POS	SAT 1
	TAN 29/2014	BOVINE	09-Oct-14	SAT 1	POS	SAT 1
	TAN 30/2014	BOVINE	09-Oct-14	SAT 1	POS	SAT 1
	TAN 31/2014	BOVINE	09-Oct-14	SAT 1	POS	SAT 1
	TAN 32/2014	BOVINE	15-Oct-14	SAT 1	POS	SAT 1
	TAN 33/2014	BOVINE	16-Oct-14	SAT 1	POS	SAT 1
	TAN 34/2014	BOVINE	16-Oct-14	SAT 1	POS	SAT 1
	TAN 35/2014	BOVINE	07-Nov-14	SAT 1	POS	SAT 1
	TAN 36/2014	BOVINE	07-Nov-14	SAT 1	POS	SAT 1
	TAN 37/2014	BOVINE	07-Nov-14	SAT 1	POS	SAT 1
	TAN 38/2014	BOVINE	07-Nov-14	SAT 1	POS	SAT 1
	TAN 39/2014	BOVINE	08-Nov-14	NEG	POS	FMDV GD
	TAN 40/2014	BOVINE	08-Nov-14	NEG	NEG	NVD
	TAN 41/2014	BOVINE	08-Nov-14	SAT 1	POS	SAT 1
TOTAL:		110				



Country	WRL for FMD Sample Identification	Species	Date of Collection	Results		
				VI / ELISA	rRT-PCR	Final report
Carried over from previous quarterly report:						
Country	WRL for FMD Sample Identification	Species	Date of Collection		Results	
				VI/ELISA	RT-PCR	Final report
AFGHANISTAN	AFG 22/2013	BOVINE	27-Jul-13	NEG	POS	FMDV GD
	AFG 23/2013	BOVINE	18-Dec-13	ASIA-1, O	POS	ASIA-1, O
	AFG 24/2013	BOVINE	23-Dec-13	NEG	POS	FMDV GD
	AFG 25/2013	BOVINE	24-Dec-13	NEG	POS	FMDV GD
	AFG 26/2013	BOVINE	26-Dec-13	NEG	POS	FMDV GD
	AFG 27/2013	BOVINE	28-Dec-13	O, ASIA-1	POS	O, ASIA-1
	AFG 28/2013	BOVINE	30-Dec-13	NEG	POS	FMDV GD
	AFG 29/2013	BOVINE	30-Dec-13	NEG	POS	FMDV GD
	AFG 30/2013	BOVINE	30-Dec-13	NEG	POS	FMDV GD
	AFG 31/2013	BOVINE	30-Dec-13	O	POS	O
	AFG 32/2013	BOVINE	30-Dec-13	NEG	POS	FMDV GD
	AFG 1/2014	BOVINE	03-Apr-14	O	POS	O
	AFG 2/2014	BOVINE	09-Apr-14	O	POS	O
	AFG 3/2014	BOVINE	12-Apr-14	O	POS	O
	AFG 4/2014	BOVINE	19-Apr-14	ASIA-1	POS	ASIA-1
	AFG 5/2014	BOVINE	23-Apr-14	O	POS	O
	AFG 6/2014	BOVINE	24-Apr-14	O	POS	O
	AFG 7/2014	BOVINE	26-Apr-14	O	POS	O
	AFG 8/2014	BOVINE	28-Apr-14	O	POS	O
	AFG 9/2014	BOVINE	02-May-14	O	POS	O
	AFG 10/2014	BOVINE	11-May-14	NEG	POS	FMDV GD
TOTAL:		20				

Abbreviations used in table:

FMD(V)	Foot-and-mouth disease (virus)
FMDV GD	Genome detected
FMDV NGD	Genome not detected (samples submitted in Trizol, only rRT-PCR carried out)
VI/ELISA	FMDV serotype identified following virus isolation in cell culture and antigen ELISA
rRT-PCR	Real-time reverse transcription polymerase chain reaction on epithelial suspension for FMD (or SVD) viral genome
NVD	No foot-and-mouth disease, swine vesicular disease or vesicular stomatitis virus detected
NT	Not tested



4. Detailed Sequence Analysis

An up-to-date list and reports of FMD viruses characterised by sequencing can be found at the following website: http://www.wrlfmd.org/fmd_genotyping/2015.htm.

Results from samples received at WRLFMD (status of samples being tested) are shown in Table 1 and a summary of all samples received by WRLFMD for this period is shown in chapter 2. A complete list of clinical sample diagnostics made by the WRLFMD between April to June 2015 is shown in chapter 3.

WRLFMD Batch No.	Date received	Country	Serotype	No. of samples	No. of sequences	Sequencing status
WRLFMD/2015/00002	24/02/2015	Pakistan	O	13	17	Completed
WRLFMD/2015/00002	24/02/2015	Pakistan	A	8	11	Completed
WRLFMD/2015/00002	24/02/2015	Pakistan	Asia 1	5	6	Completed
WRLFMD/2015/00002	24/02/2015	Pakistan	A+O	3	-	Completed
WRLFMD/2015/00002	24/02/2015	Pakistan	Asia 1+O	1	-	Completed
WRLFMD/2015/00003	31/03/2015	Afghanistan	O	9	11	Completed
WRLFMD/2015/00003	31/03/2015	Afghanistan	O+Asia 1	2	-	Completed
WRLFMD/2015/00003	31/03/2015	Afghanistan	Asia 1	2	3	Completed
WRLFMD/2015/00004	01/04/2015	Bahrain	O	9	9	Completed
WRLFMD/2015/00005	09/04/2015	Mongolia	O	4	4	Completed
WRLFMD/2015/00006	13/04/2015	Mauritania	SAT 2	4	4	Completed
WRLFMD/2015/00007	30/04/2015	Oman	SAT 2	3	3	Completed
WRLFMD/2015/00008	30/04/2015	Tanzania	O	8	-	Pending
WRLFMD/2015/00008	30/04/2015	Tanzania	SAT 1	29	-	Pending
WRLFMD/2015/00009	07/05/2015	Ethiopia	O	3	3	Completed
WRLFMD/2015/00009	07/05/2015	Ethiopia	SAT 2	4	4	Completed
WRLFMD/2015/00011	29/05/2015	Hong Kong SAR	O	2	2	Completed
WRLFMD/2015/00012	29/05/2015	Taiwan POC	Pending	5	-	Pending
				114	77	

Table 1: Status of sequencing of samples received by the WRLFMD from April to June 2015 (*) indicates samples carried over from the last quarter)



Africa:

Ethiopia

WRLFMD/2015/00009

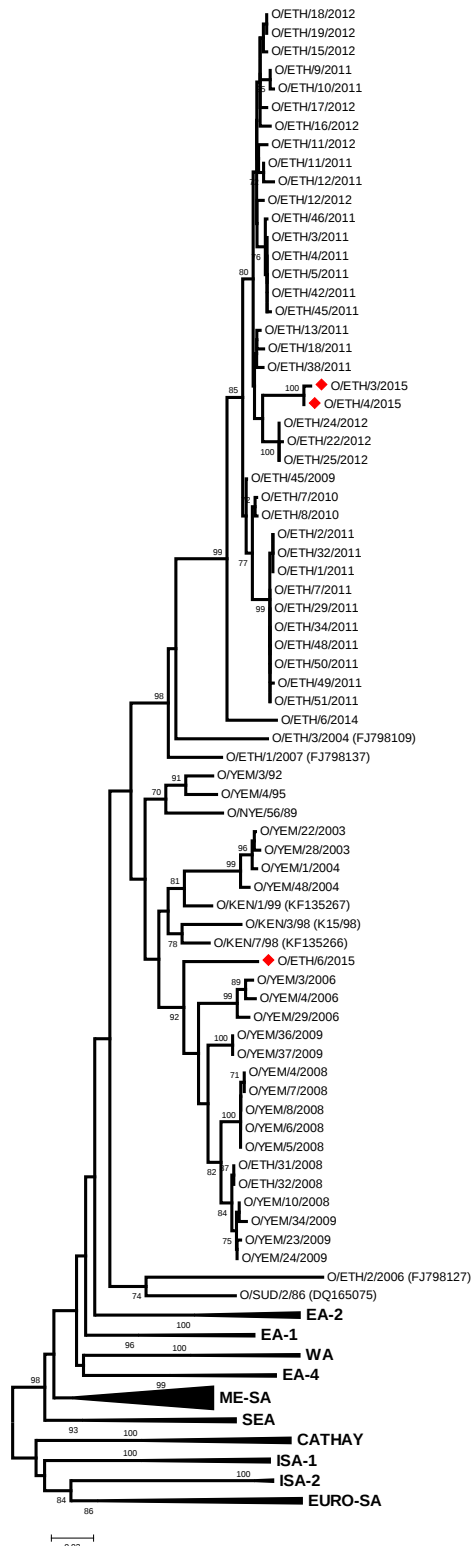
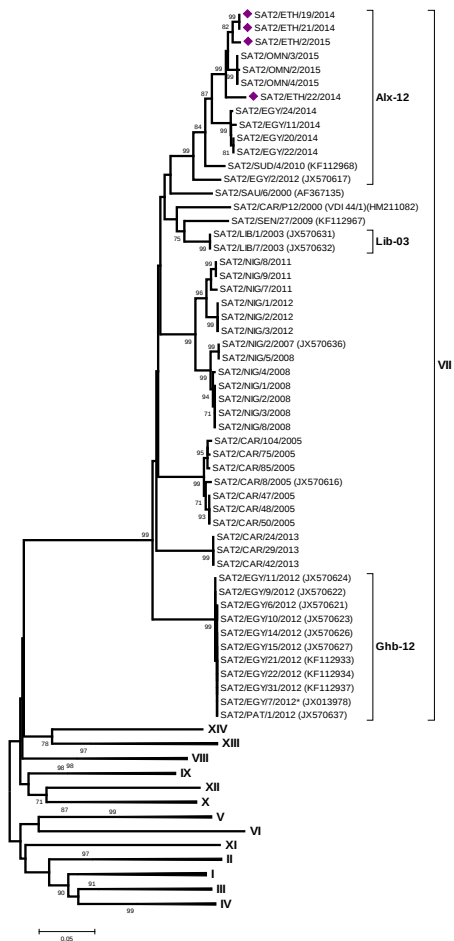
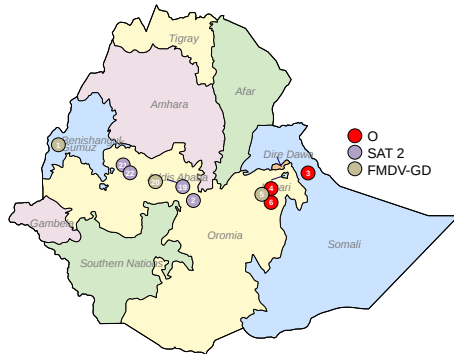
Date sequence received: 07/05/2015

No. of samples: 10

O (EA-3): 3

SAT 2 (VII/Alx-12): 4

FMDV-GD: 3





Mauritania

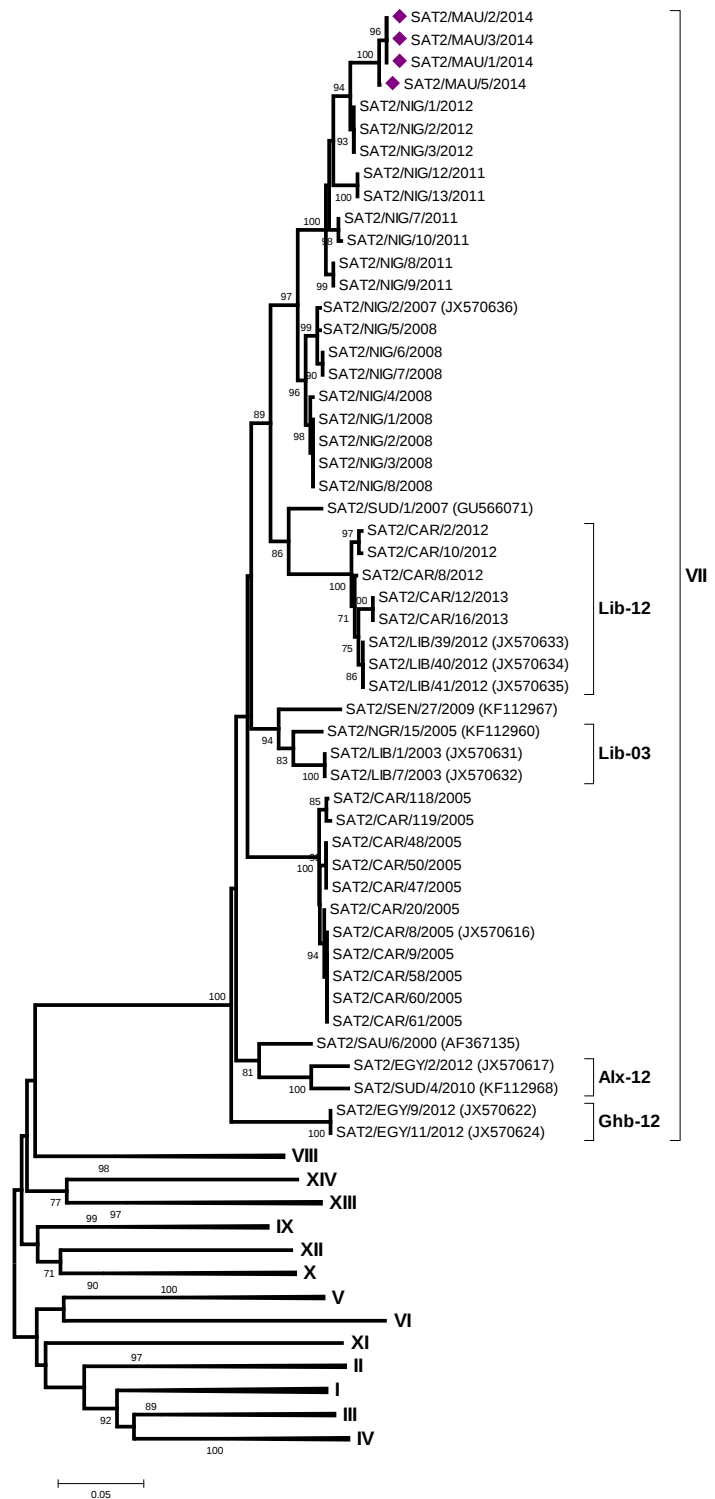
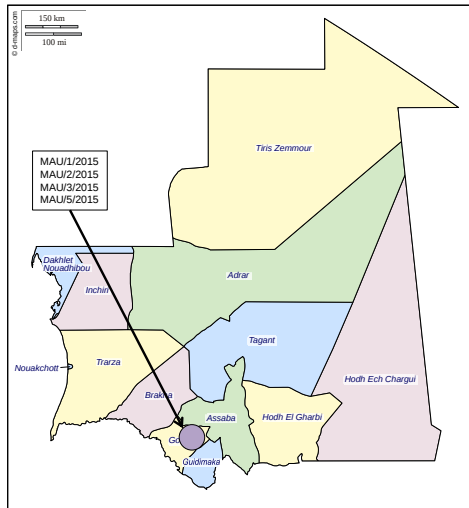
WRLFMD/2015/00006

Date sequence received: 13/04/2015

No. of samples: 5

SAT 2 (VII): 4

FMDV-GD: 1





Asia:

Afghanistan

WRLFMD/2015/00003

Date sequence received: 31/03/2015

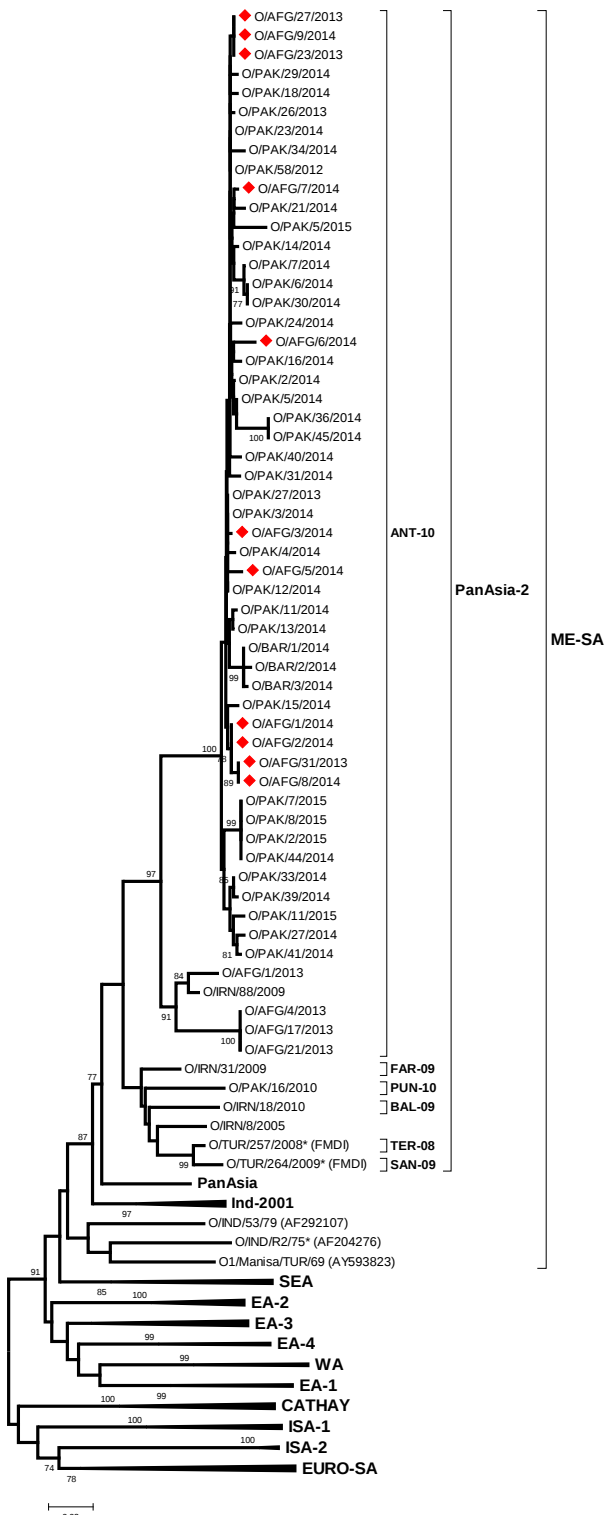
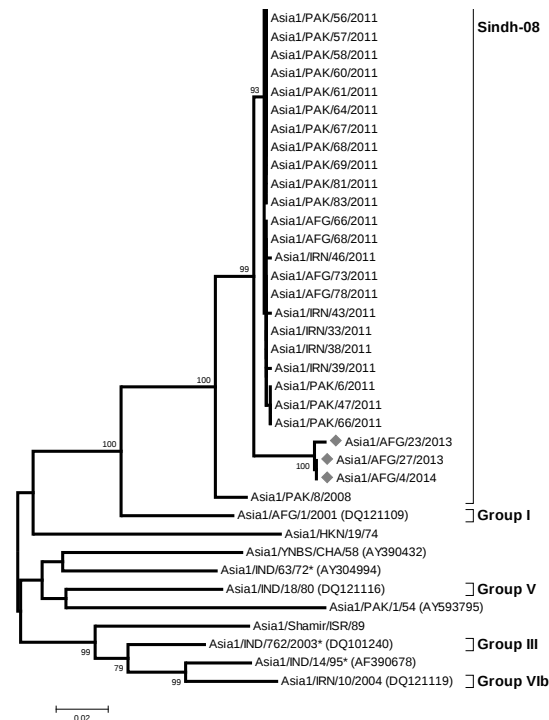
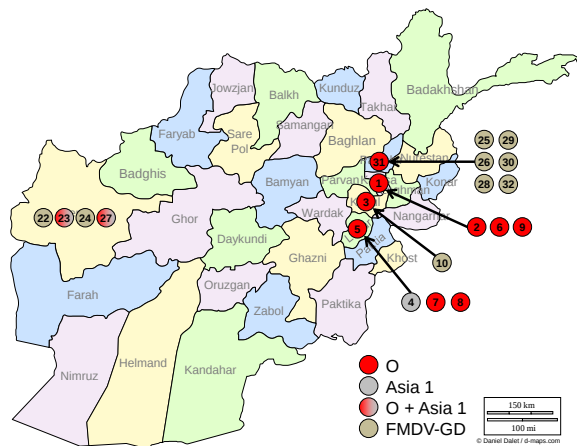
No. of samples: 21

O (ME-SA/PanAsia-2^{ANT-10}): 9

Asia 1 (ASIA/Sindh-08): 1

O + Asia 1 (ME-SA/PanAsia-2^{ANT-10} + ASIA/Sindh-08): 2

FMDV-GD: 9





Bahrain

WRLFMD/2015/00004

Date sequence received: 01/04/2015

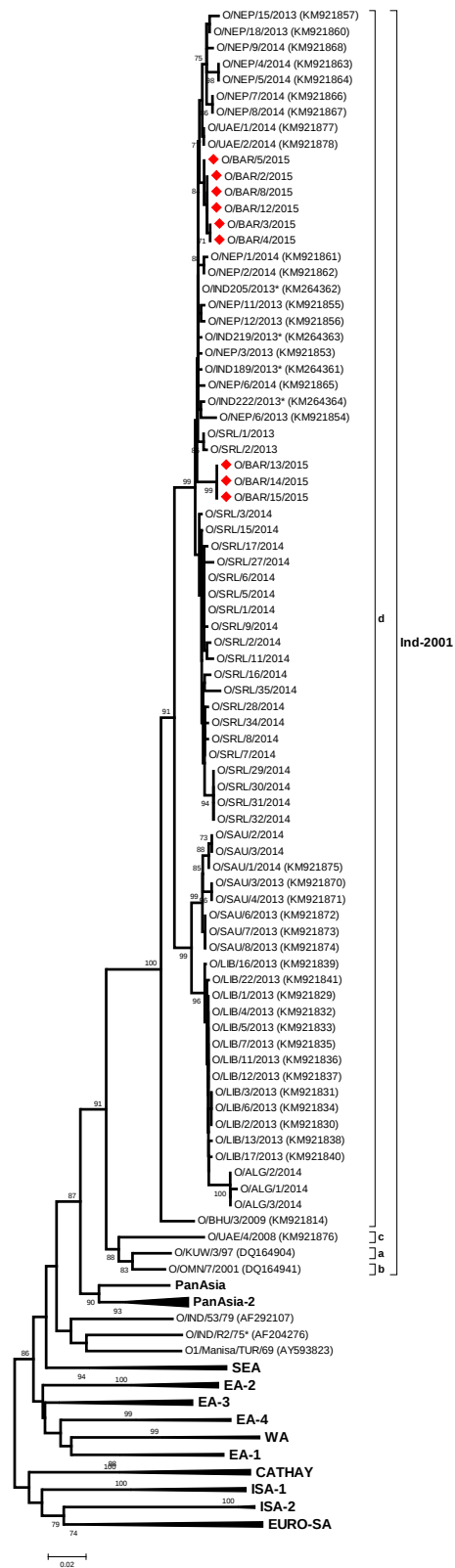
No. of samples: 15

O (ME-SA/Ind-2001d): 9

FMDV-GD: 1

NVD: 5

No location given.





Hong Kong SAR

WRLFMD/2015/00011

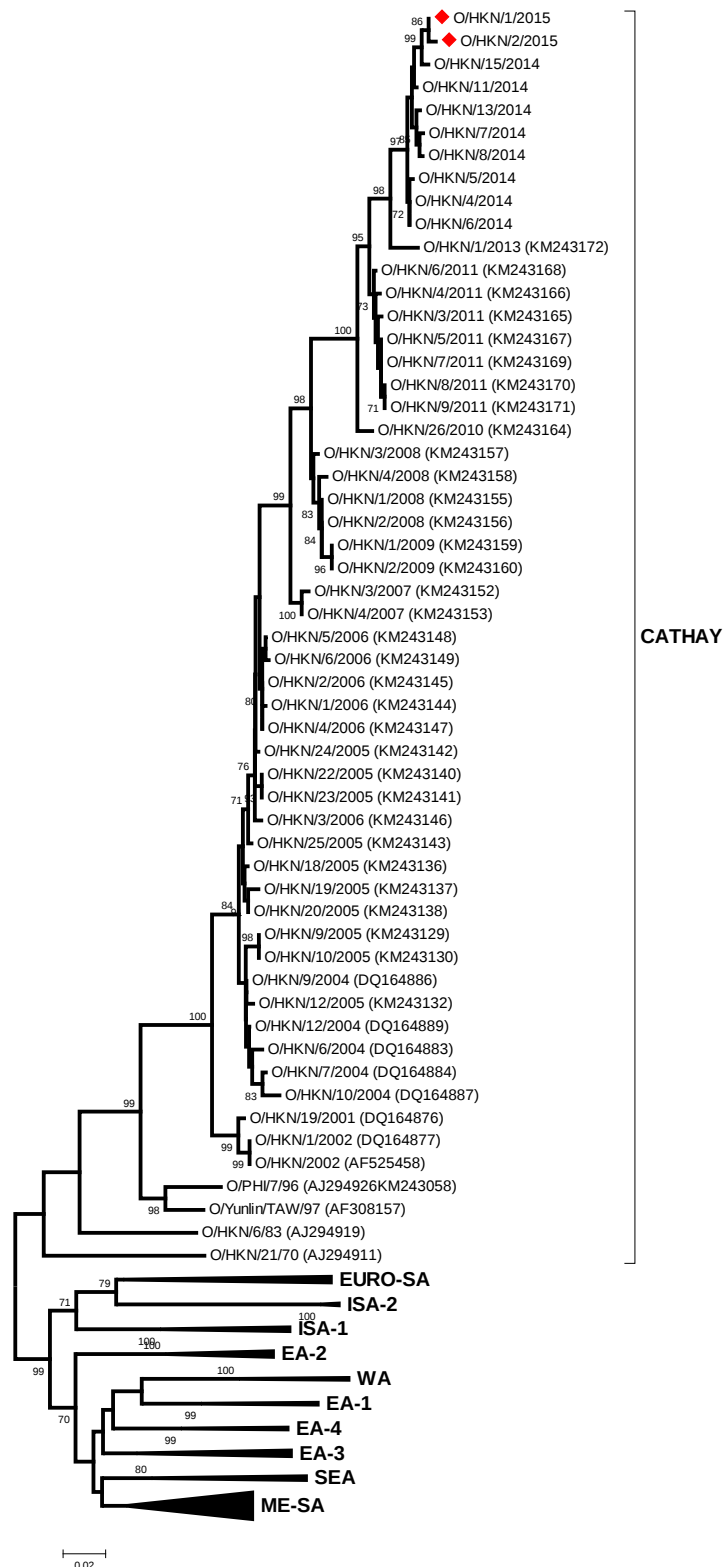
Date sequence received: 29/05/2015

No. of samples: 4

O (CATHAY): 2

FMDV-GD: 2

Location: Ma On Kong, Kam Tin,
New Territories





Mongolia

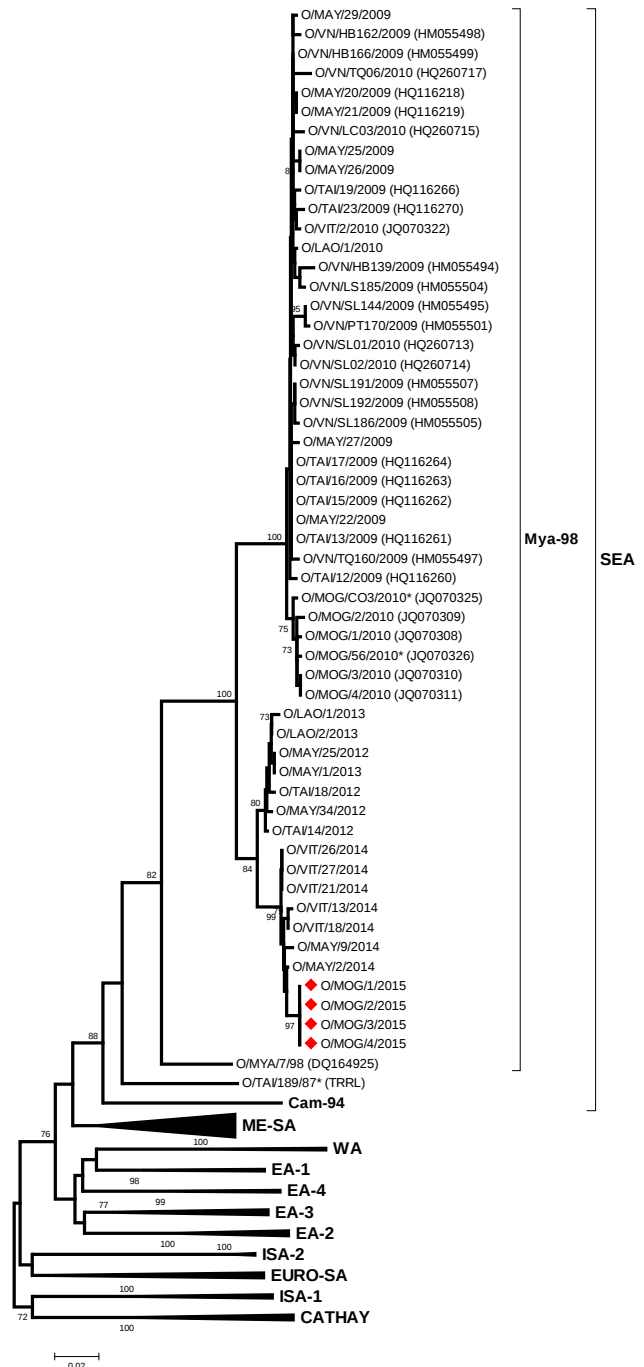
WRLFMD/2015/00005

Date sequence received: 09/04/2015

No. of samples: 4

O (SEA/Mya-98): 4

No location given.





Oman

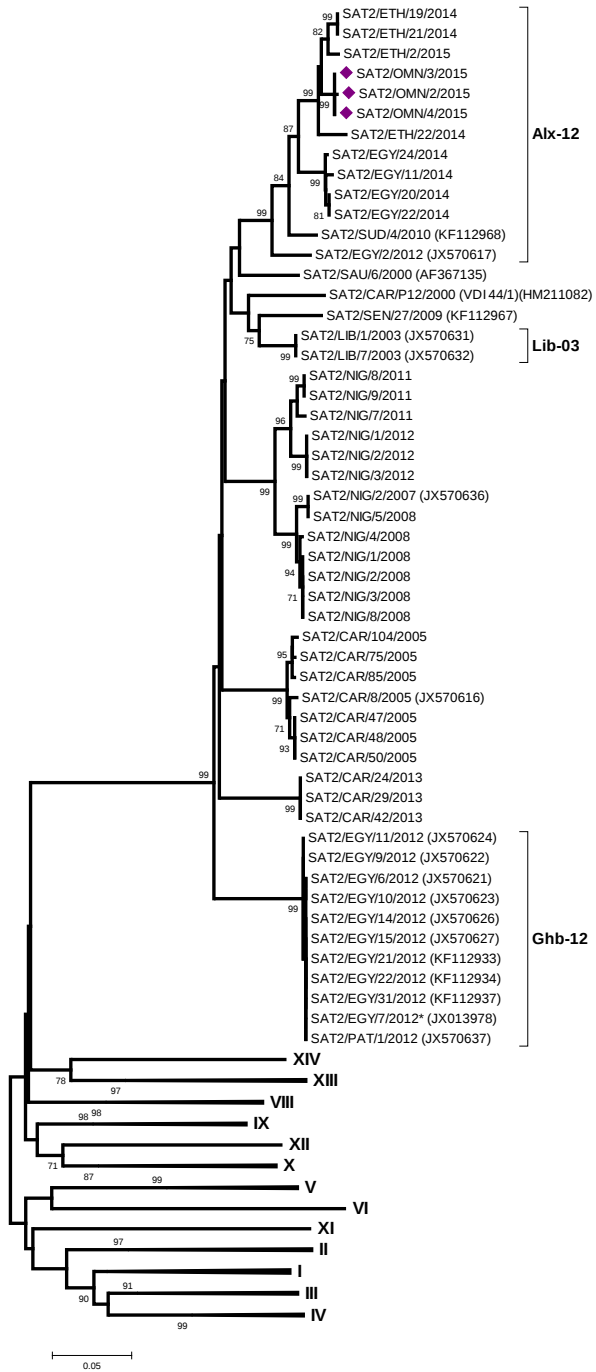
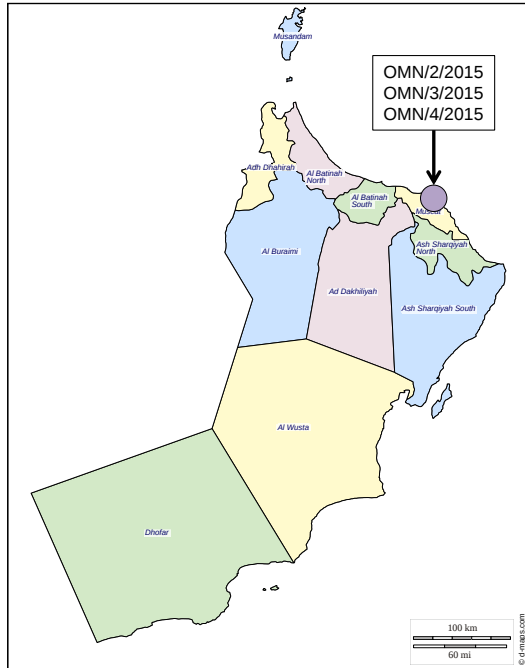
WRLFMD/2015/00007

Date sequence received: 30/04/2015

No. of samples: 4

SAT 2 (VII): 3

FMDV-GD: 1





Pakistan

WRLFMD/2015/00002

Date sequence received: 24/02/2015

No. of samples: 32

O (ME-SA/PanAsia-2^{ANT-10}): 13

A (ASIA/Iran-05^{FAR-09}): 5

A (ASIA/Iran-05^{FAR-11}): 3

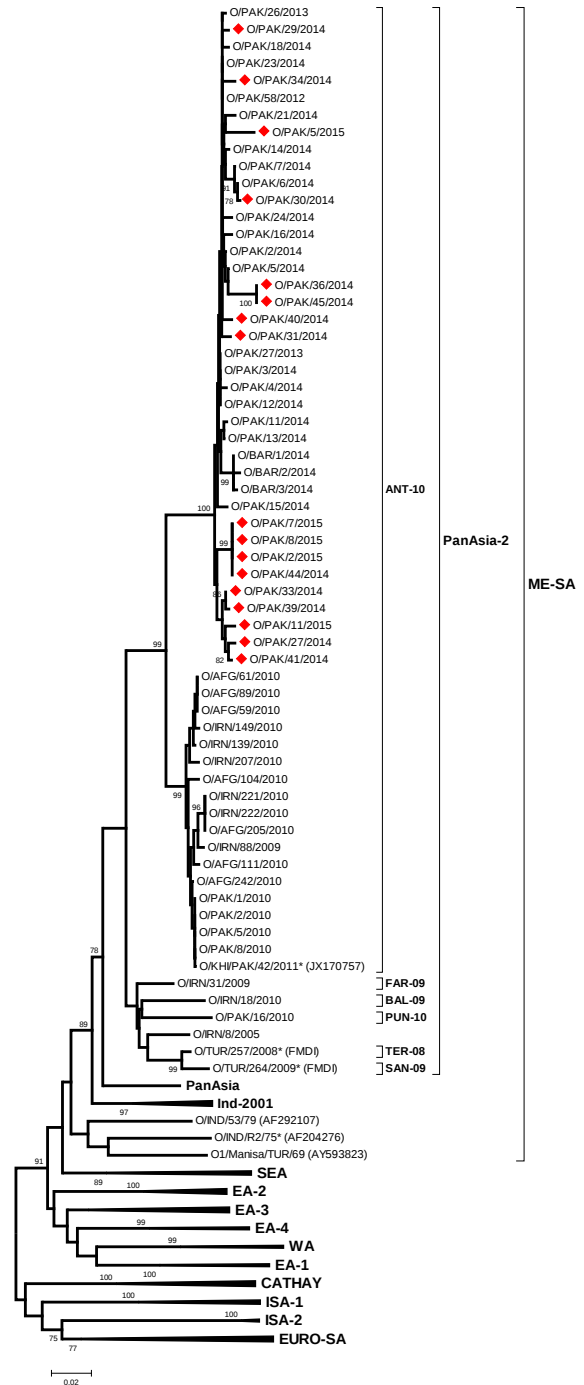
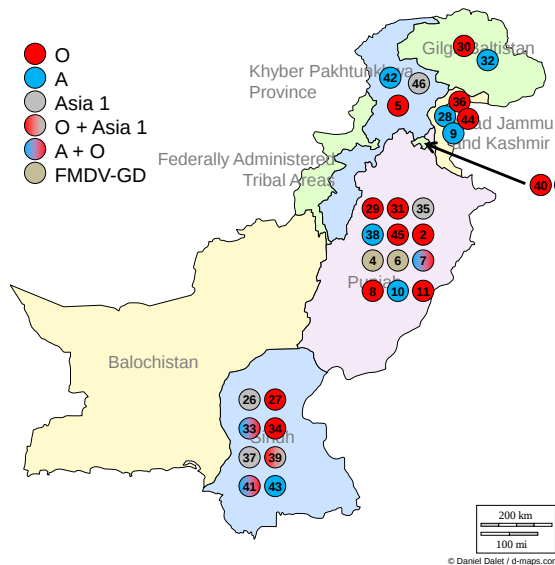
Asia 1 (ASIA/Sindh-08): 5

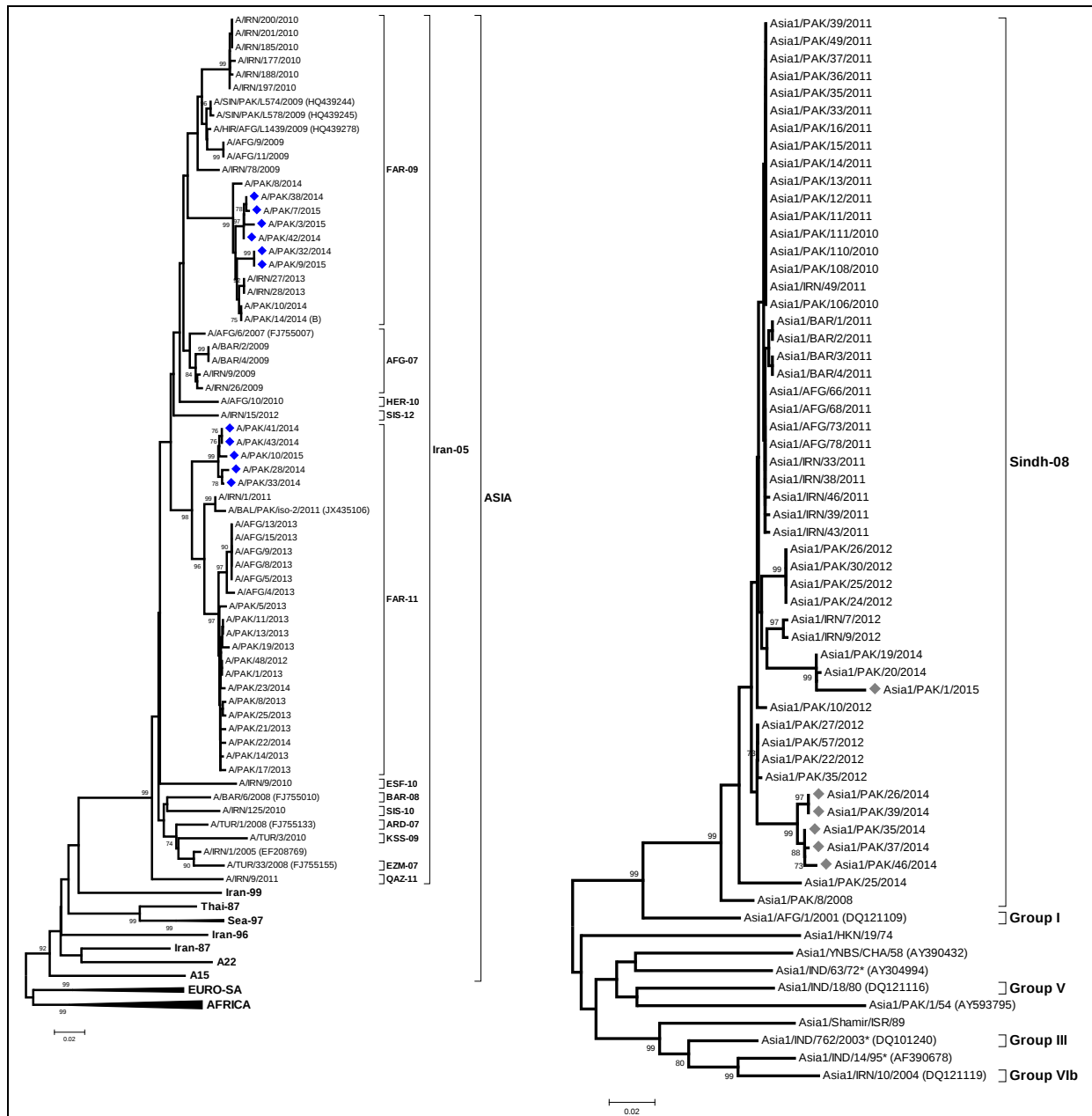
A + O (ASIA/Iran-05^{FAR-09} + ME-SA/PanAsia-2^{ANT-10}): 1

A + O (ASIA/Iran-05^{FAR-11} + ME-SA/PanAsia-2^{ANT-10}): 2

Asia 1 + O (ASIA/Sindh-08 + ME-SA/PanAsia-2^{ANT-10}): 1

FMDV-GD: 2







5. Vaccine matching

Antigenic characterisation of FMD field isolates by vaccine matching by 2dm VNT from April to June 2015

Table 2: Serotype O

Sample Reference	Vaccine strain			
	O 3039	O Manisa	O/SKR/7/2010	O/TUR/5/2009
O/EGY/23/2014	N	N	n.d.	M
O/EGY/36/2014	M	N	n.d.	M
O/MOG/2/2015	M	N	n.d.	M
O/MOG/4/2015	M	N	n.d.	M
O/VIT/11/2014	M	N	M	M
O/VIT/26/2014	M	N	M	M

Table 3: Serotype A

Sample Reference	Vaccine strain			
	A Iran 2005	A22 IRQ	A MAY97	A/TUR/20/2006
A/PAK/3/2014	N	N	n.d.	N
A/PAK/10/2015	M	N	n.d.	N
A/VIT/8/2014	N	M	N	N
A/VIT/14/2014	N	M	N	N

Table 4: Serotype Asia 1

Sample Reference	Vaccine strain
	Asia 1 Shamir
Asia 1 AFG/4/2014	N
Asia 1 PAK/35/2014	N
Asia 1 PAK/1/2015	N

Table 5: Serotype SAT 1

Sample Reference	Vaccine strain
	SAT 105 RHO
SAT 1 BOT/4/2014	M



Table 6: Serotype SAT 2

Sample Reference	Vaccine strain	
	SAT 2 ERI	SAT 2 ZIM
SAT 2 BOT/1/2013	N	N
SAT 2 EGY/43/2012	M	N
SAT 2 EGY/24/2014	M	N
SAT 2 MOZ/2/2014	B	M
SAT 2 MOZ/4/2014	M	M
SAT 2 OMN/4/2015	M	N
SAT 2 ZIM/1/2014	M	M
SAT 2 ZIM/3/2014	M	M

Abbreviations used in tables:

M	Vaccine Match- $r_1 = \geq 0.3$. Suggests that there is a close relationship between field isolate and vaccine strain. A potent vaccine containing the vaccine strain is likely to confer protection.
N	No Vaccine Match - $r_1 = < 0.3$. Suggests that the field isolate is so different from the vaccine strain that the vaccine is unlikely to protect
Borderline	Any r_1 values between 0.28 to 0.32
NT	Not tested against this vaccine



6. Vaccine strain recommendations

RECOMMENDATIONS FROM WRLFMD® ON FMD VIRUS STRAINS TO BE INCLUDED IN FMDV ANTIGEN BANKS (FOR FMD-FREE COUNTRIES) – June 2015

Note: Virus strains are NOT listed in order of importance

High Priority	O Manisa O PanAsia-2 (<i>or equivalent</i>) O BFS or Campos A24 Cruzeiro Asia 1 Shamir A Iran-05 (<i>or A TUR 06</i>) A22 Iraq SAT 2 Saudi Arabia (<i>or equivalent i.e. SAT 2 Eritrea</i>)
Medium Priority	A Eritrea SAT 2 Zimbabwe SAT 1 South Africa A Malaysia 97 (<i>or Thai equivalent such as A/Sakolnakorn/97</i>) A Argentina 2001 O Taiwan 97 (<i>pig-adapted strain or Philippine equivalent</i>)
Low Priority	A Iran '96 A Iran '99 A Iran 87 or A Saudi Arabia 23/86 (<i>or equivalent</i>) A15 Bangkok related strain A87 Argentina related strain C Noville SAT 2 Kenya SAT 1 Kenya SAT 3 Zimbabwe

NB: Discussions are currently underway to adopt a risk-based approach for different FMD viral lineages to identify priority vaccines for use in Europe and other FMD-free settings.



7. Recent FMD publications

*Recent FMD Publications (January-March 2015) cited by Web of Science (Papers from The Pirbright Institute are highlighted in **BOLD AND GREY**)*

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