



WRLFMD Quarterly Report July-September 2010

Reference Laboratory Contract Report

10/25/2010

WRLFMD

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**FAO/OIE Reference Laboratory Contract Report^{1,2}
July-September 2010**

Foot-and-Mouth Disease

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² Copies of all the individual reports cited herein can be obtained from Dr. Jef Hammond, IAH-Pirbright, jef.hammond@bbsrc.ac.uk.

Summary

ASIA

Afghanistan, Iran, Pakistan and Turkey

The O-PanAsia-2 and A-Iran-05 lineages continue to dominate in these countries. The PanAsia-2 lineage has been subdivided into six sub-lineages named BAL-09, YAZ-09, FAR-09, SAN-09, ANT-10 and PUN-10. During 2010, the ANT-10 sub-lineage has become dominant in Iran and Turkey. This sub-lineage has been detected in Pakistan, but not yet in Afghanistan.

P.R. China

Three further outbreaks of FMDV type O occurred in July and August 2010, bringing the total to 17:

27/07/2010: Chengdong village, Shan Dan, Zhang Ye, Gansu (pigs);

23/08/2010: Huangzangsi, Qilian, Habei Prefecture, Qinghai (cattle);

23/08/2010: Animal health inspection station of Er Ba Tai, Ku Che, Akesu, Xinjiang (cattle).

No information concerning the genotyping of viruses from these outbreaks is yet available.

Taiwan POC

As the result of a routine serological survey using an NSP Elisa, 8 pigs in a herd of 1428, at Sinwu Township, T'ao-Yuan (10/08/2010) were found to be positive for FMDV antibodies. The pigs were all clinically healthy and attempts at virus isolation and RT-PCR were all unsuccessful.

Japan

The last (292nd) outbreak of FMD occurred on 04/07/2010 at Miyazaki city 3, Miyazaki. One of 16 cattle showed clinical signs and was confirmed as having type O. No outbreaks have occurred since.

Mongolia

Two new outbreaks of FMDV type O occurred on 26/08/2010 at Sukhbaatar soum, Baga-3 Gun jalga, Sukhbaatar in sheep and goats and on 02/09/2010 at Teeliin bulag, Tsagaanchuluut бага, Chuluunhoroot soum, Dornod in cattle. All outbreaks this year (n=5) have been in the east of the country.

Russian Federation

Two outbreaks of FMDV type O occurred on 05/07/2010 at Abagaytuy, Zabajkal'skij Kray and on 26/08/2010 at Village Makarovo, Shilkinsky, Zabajkal'skij Kray. Both outbreaks involved cattle and pigs. Complete VP1 sequences of viruses from both outbreaks were submitted to the WRLFMD by ARRIAH. The sequences indicated that both viruses belonged to the SEA topotype, Mya-98 lineage, however, the virus from the July 2010 outbreak was most closely related to viruses from Hong Kong SAR, Republic of Korea and Japan, while the virus from the August outbreak was closely related to a virus sequence from recent outbreaks in Mongolia, indicating different origins for the two outbreaks (see detailed analysis below).

AFRICA

Botswana

An outbreak of FMD caused by the SAT 2 serotype occurred in 200/349 cattle at Lesoma, Chobe, Kasane between 26/07/2010 and 20/09/2010. Lesoma is a village located in the north-east of Botswana close to the borders with Zimbabwe and Namibia. Samples have been typed at the Botswana Vaccine Institute (OIE's Reference Laboratory) and genotyping results are awaited.

Namibia

An outbreak of FMD which was reported previously (09/04/2010) on Impalila island, Kabbe constituency, Caprivi was confirmed by the OVI as being caused by SAT 1. It is suspected that transmission of FMDV occurred from wild African buffalo (*Syncerus caffer*) resident in the area.

Mozambique

Four outbreaks of FMD were reported in cattle in the south of the country (Gaza province) on 24/09/2010. Samples were submitted to the OVI and results are awaited. It is thought that FMD originated from infected cattle moved from Chicualacuala District (close to the Zimbabwe border) to Bilene and Chokwe Districts (which are located further south in Mozambique).

South Africa

An outbreak of FMD occurred in 19/80 cattle on 06/08/2010 at Malati, Ba-Phalaborwa, Limpopo in the FMD Protection Zone adjacent to the Kruger National Park. No typing results have yet been reported by the OVI.

Zimbabwe

The FMD situation following four outbreaks of SAT 2 between May and June, at Mangwe, Matebeleland South, is unclear. Animals are suspected to have been in contact with previously infected animals during a previous outbreak that occurred in September 2009 at a feedlot in the area.

SOUTH AMERICA*Venezuela*

Panaftosa reported the presence of FMD type A in Venezuela in July 2010.

Uncharacterised FMD viruses

A number of other 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.

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/2010.htm.

WRLFMD vaccine recommendations have not changed from the previous report (Annex 3).

Results from samples received at WRLFMD (status of samples being tested) are shown in Table 1 and a complete list of clinical sample diagnostics made by the WRLFMD between July and September 2010 is shown in Annex 1 Table A. A record of all samples received to IAH-Pirbright (July-September 2010) is shown in Annex 1 Table B.

Table 1: Status of sequencing of samples received by the WRLFMD from July-September 2010.

Batch	Date Recd.	Country	Serotype(s)	No. of isolates	Status
WRLFMD/2010/00024*	26/05/2010	Iran	O	78	Completed
			A	7	Completed
WRLFMD/2010/00026*	10/06/2010	Kenya	O	2	Completed
			SAT 1	36	Completed
WRLFMD/2010/00028	25/06/2010	Myanmar	O	5	Completed
WRLFMD/2010/00029	31/08/2010	Pakistan	O	10	Completed
			A	1	Completed
WRLFMD/2010/00030	31/08/2010	Afghanistan	O-GD	63	In progress
			A-GD	8	In progress
			O+A-GD	2	In progress
WRLFMD/2010/00031	02/09/2010	Turkey	O	20	Completed
			A	3	Completed
WRLFMD/2010/00032	29/09/2010	Iran	O	11	Completed
			A	3	Completed
Total				249	

*, carried over from last report.

GD, genome detected.

Detailed Analysis:

ASIA

Afghanistan

WRLFMD/2010/00030

Date received: 31/08/2010

No. samples: 81 (collected in RNAlater®)

O-GD: 63

A-GD: 8

O+A-GD: 2

NVD: 8

VP1 sequencing of these samples is in progress and the results will be presented in the next quarterly report.

Iran

WRLFMD/2010/00024

Date received: 26/05/2010

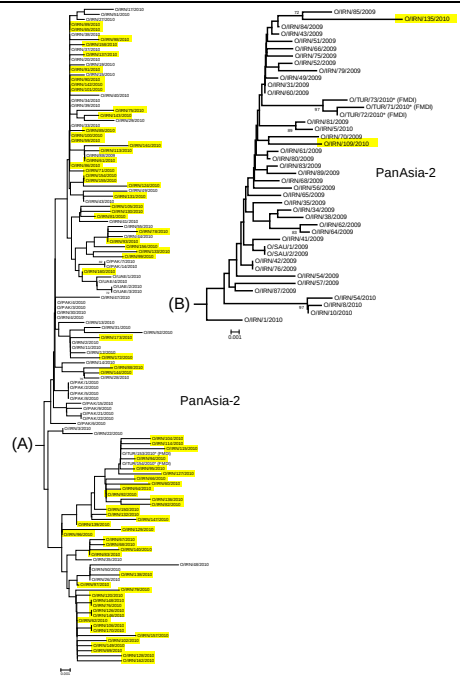
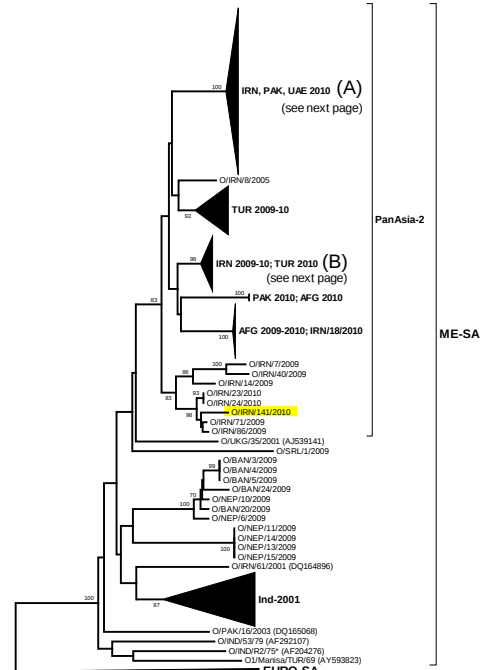
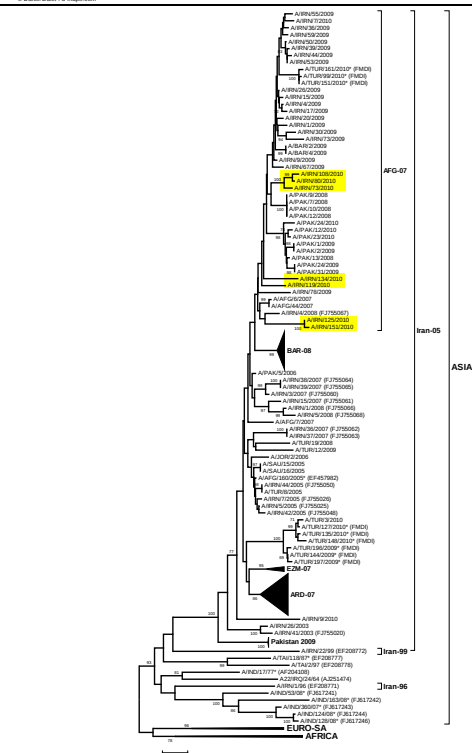
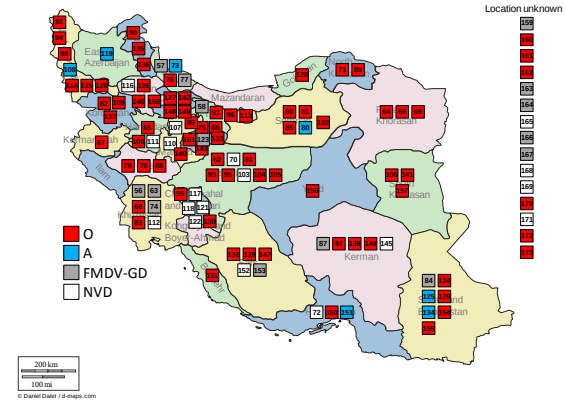
No. samples: 118

O: 78

A: 7

FMDV-GD: 15

NVD: 18



Iran

WRLFMD/2010/00032

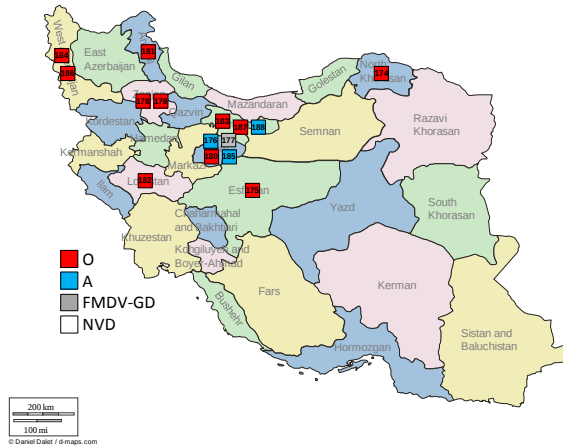
Date received: 29/09/2010

No. samples: 15

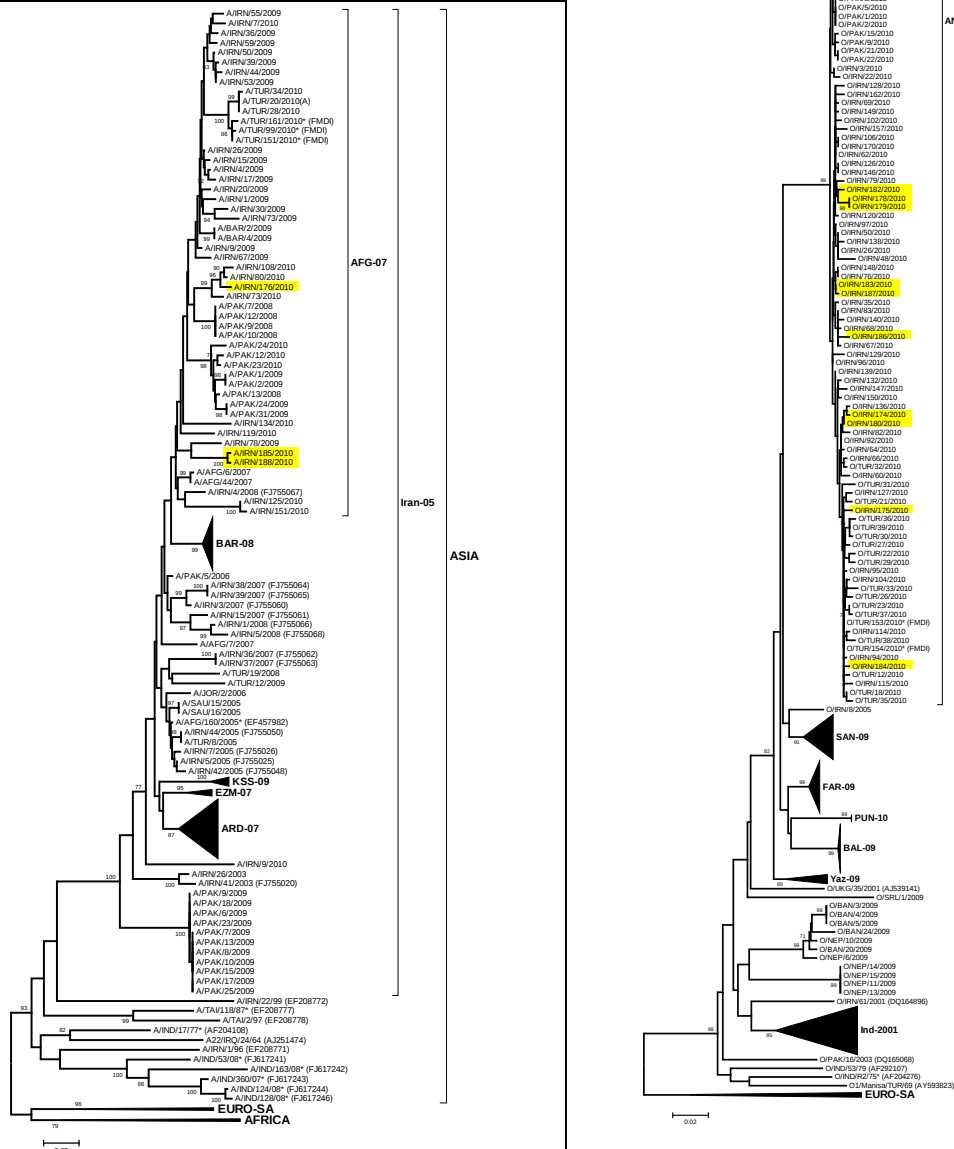
O: 11

A: 3

FMDV-GD: 1



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ANT-10

PanAsia-2

ME-SA

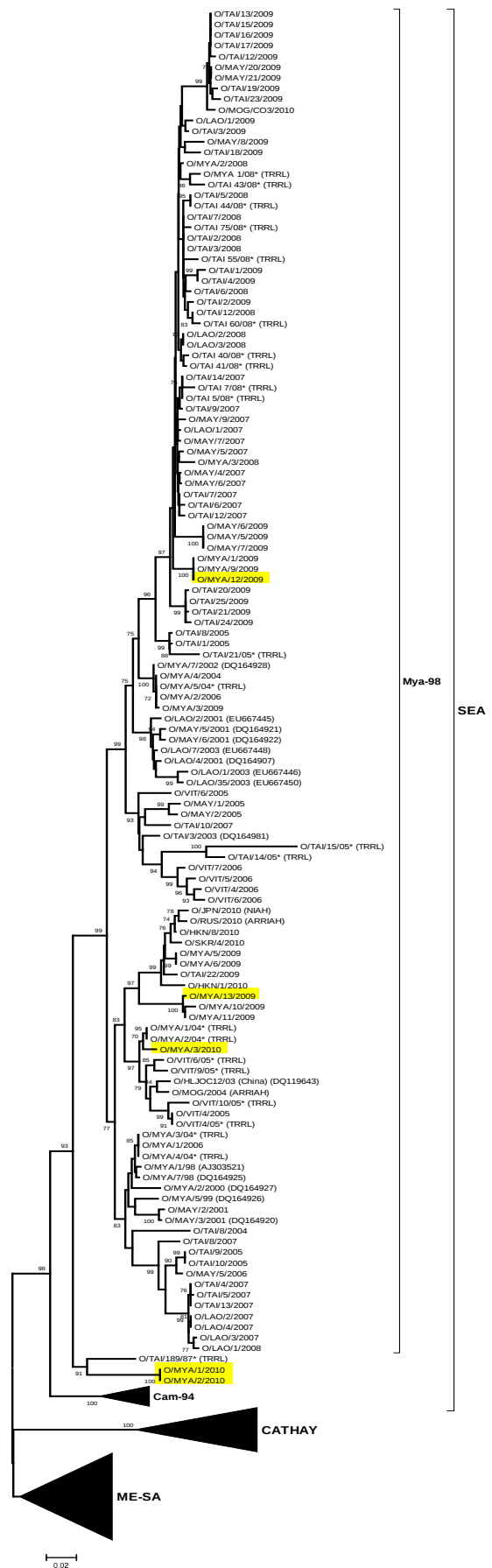
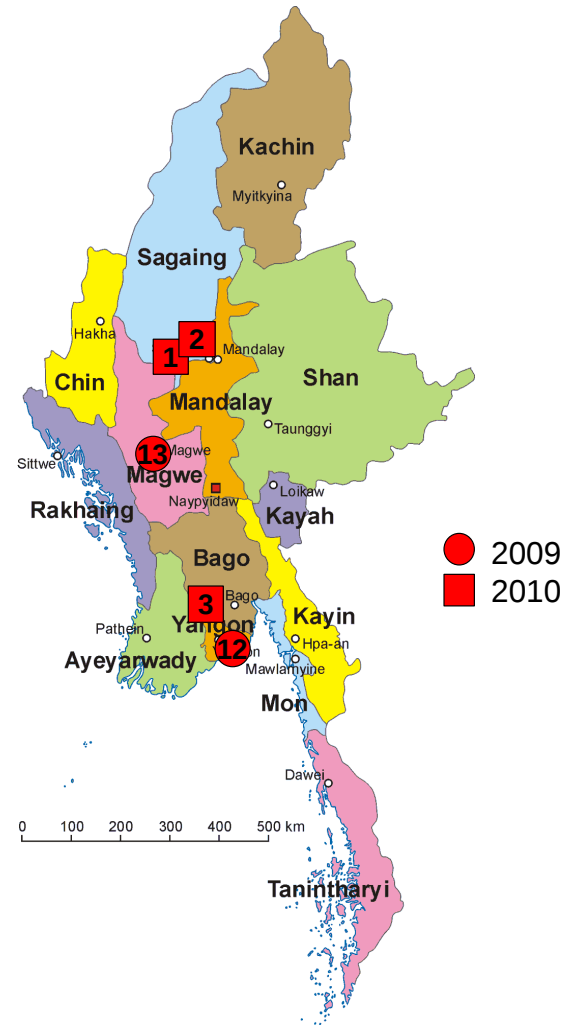
Myanmar

WRLFMD/2010/00028

Date received: 25/06/2010

No. samples: 5

O: 5



Pakistan

WRLFMD/2010/00029

Date received: 31/08/2010

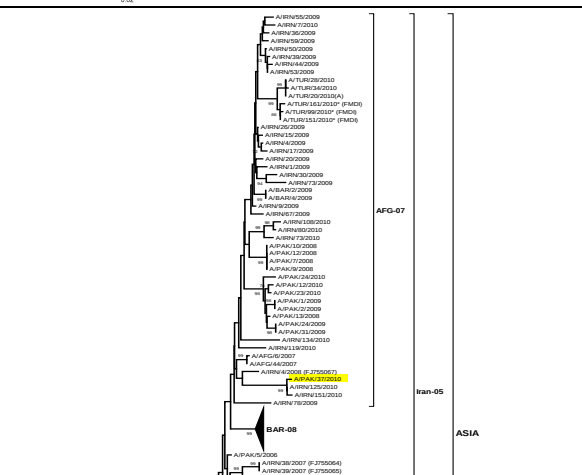
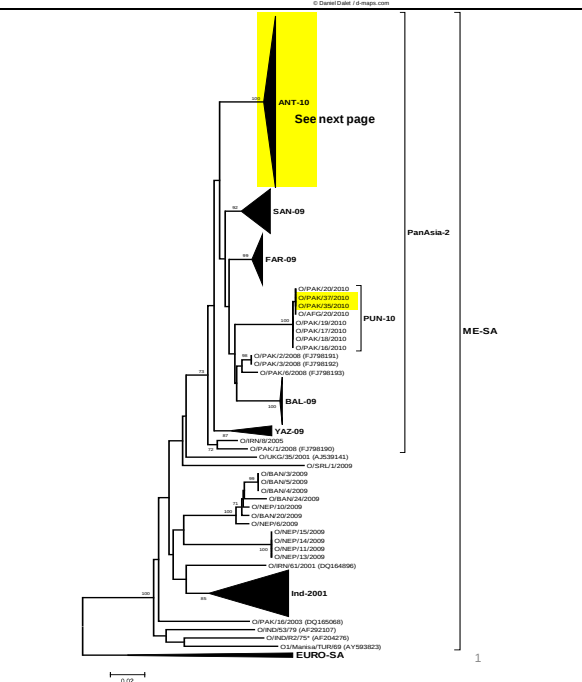
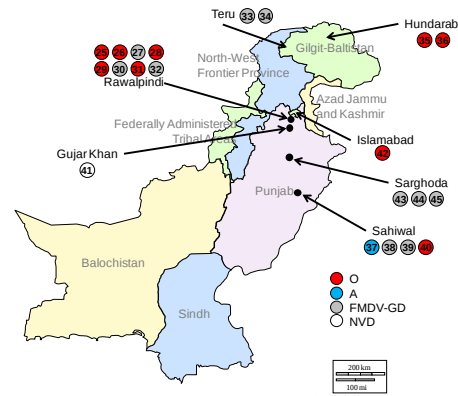
No. samples: 22

O: 10

A: 1

FMDV-GD: 10

NVD: 1



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 OIRN/137/2010
 OIRN/37/2010
 OIRN/19/2010
 OIRN/68/2010
 OIRN/101/2010
 OIRN/15/2010
 OIRN/90/2010
 OIRN/40/2010
 OIRN/65/2010
 OIRN/85/2010
 OIRN/91/2010
 OIRN/86/2010
 OIRN/58/2010
 OIRN/27/2010
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 OIRN/51/2010
 OIRN/142/2010
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 OIRN/35/2010

ANT-10

PanAsia-2

ME-SA

Turkey

WRLFMD/2010/00031

Date received: 02/09/2010

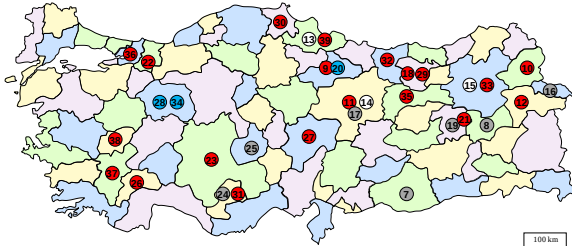
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O: 20

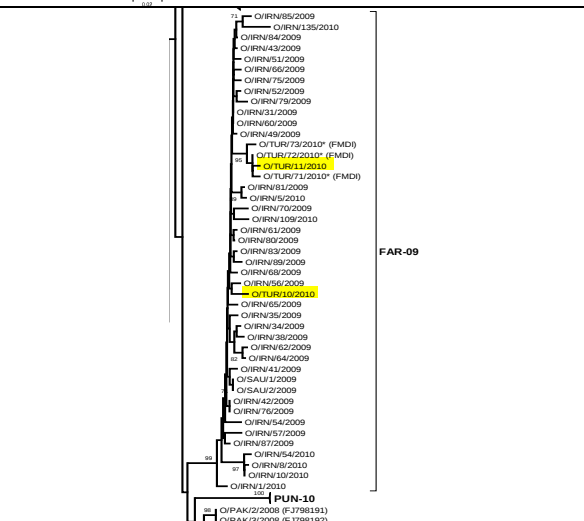
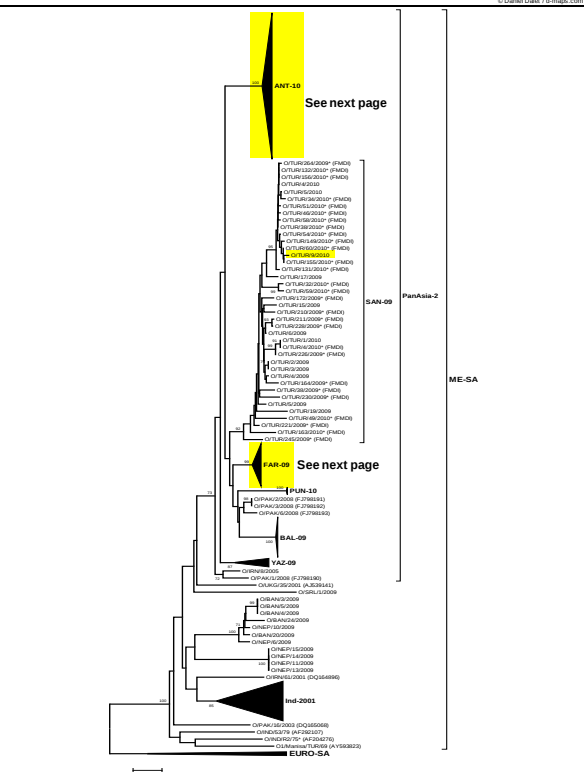
A: 3

FMDV-GD: 7

NVD: 3



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ANT-10

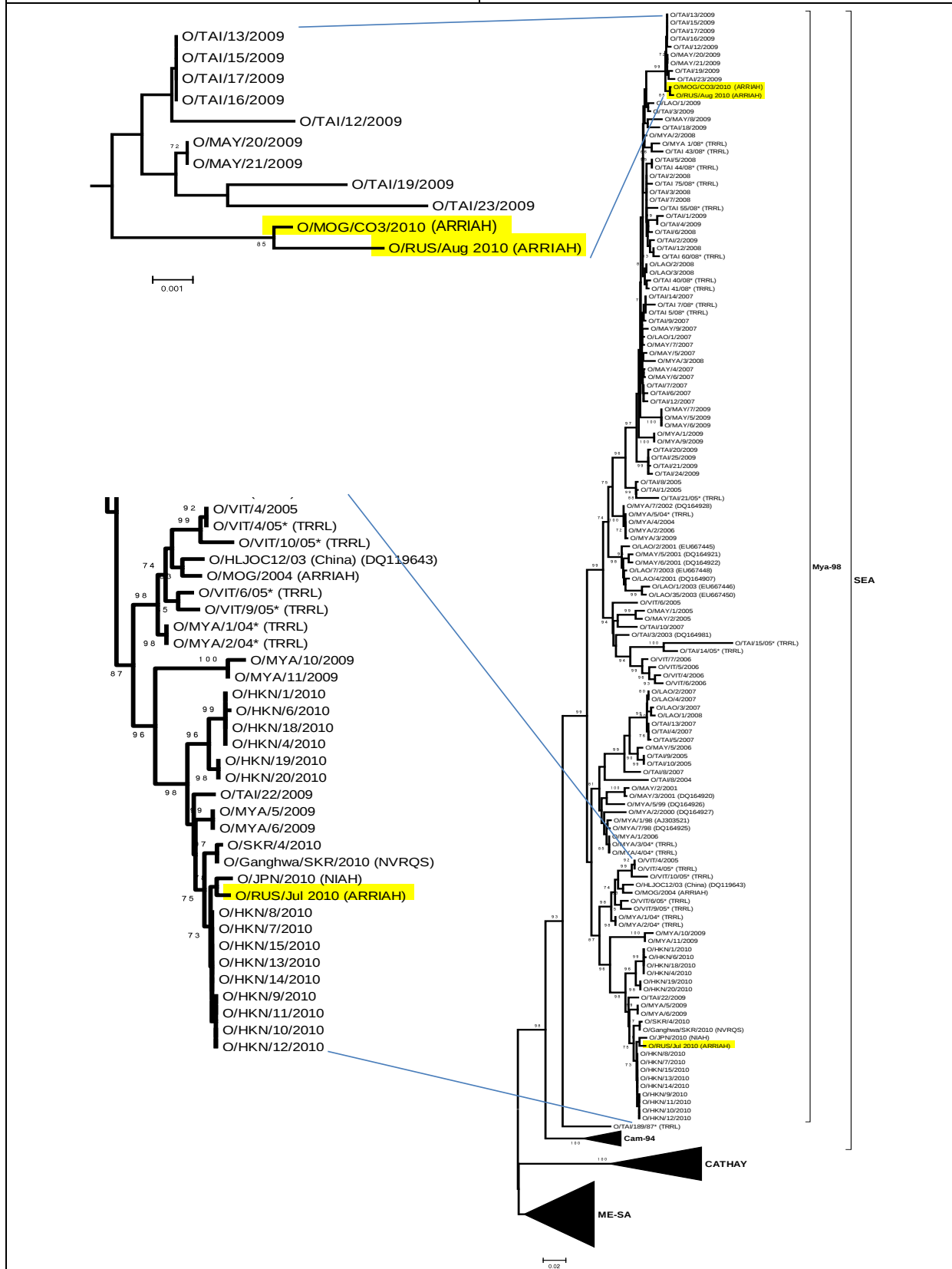
PanAsia-2

ME-SA



Russian Federation

Two FMDV type O VP1 sequences received from ARRIAH.



Kenya

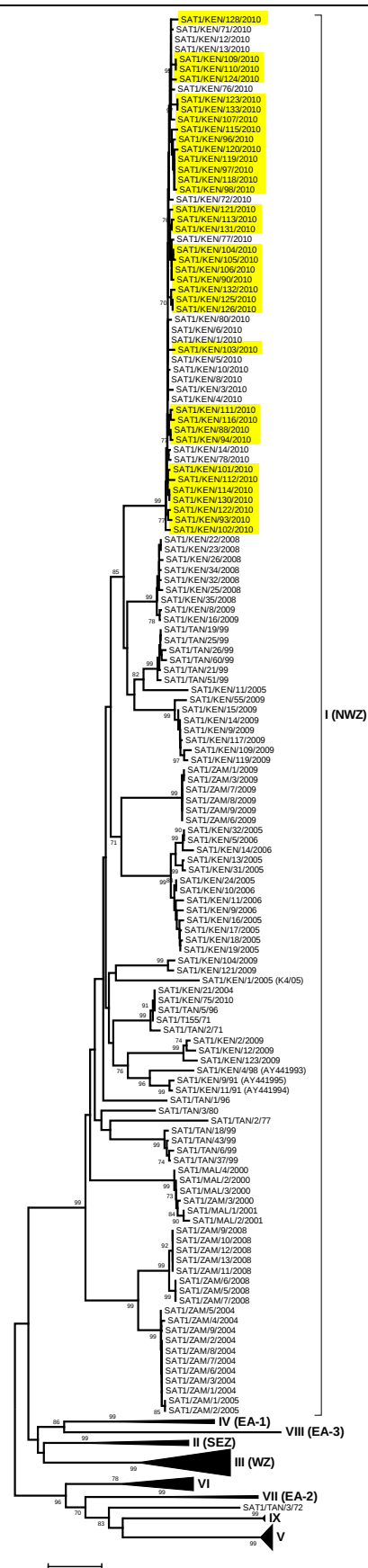
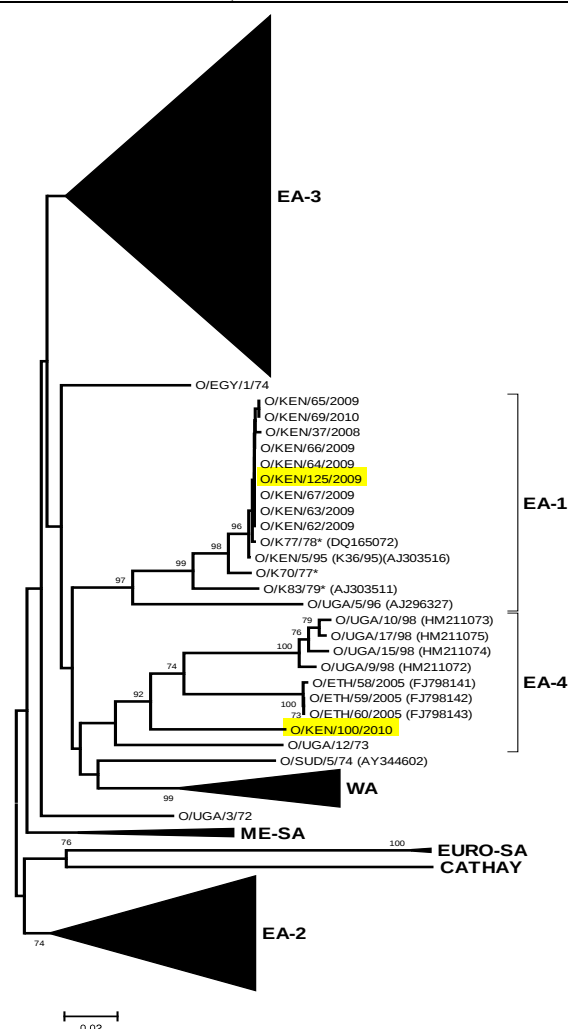
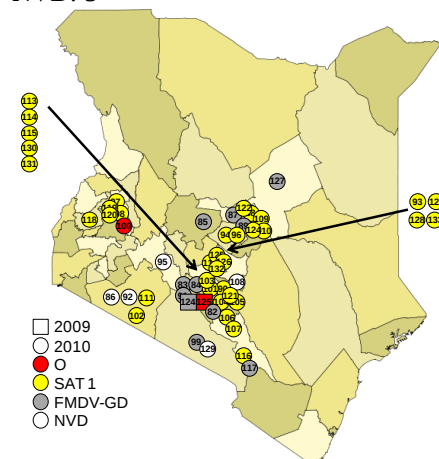
Date received: 10/06/2010

0: 2

SAT 1: 36

FMDV-GD: 11

NVD: 5



Vaccine matching

Fourteen FMDV type O isolates (See Table C, Type O for details) from Ecuador, Iran, Pakistan and United Arab Emirates (UAE) collected in 2009 and 2010 were analysed antigenically by the two dimensional virus neutralisation test (2dmVNT) and/or LPBE. All isolates from Iran, Pakistan and UAE were matched with O Manisa, O IND R2/75, O TAW 98 and O BFS by 2dmVNT or LPBE except one isolate, respectively. Four isolates from Pakistan and UAE also showed close match with O Campos, O IND 53/79 and O TAI 189/87 by VNT or LPBE. Two isolates from Ecuador showed no match with any of the testing vaccine strains. Five isolates from IRAN were antigenically close to O 4174 by LPBE (Table C).

Nine FMDV type A viruses (see table C, Type A for details) from Iran, Nigeria, Pakistan and Tanzania collected in 2009 and 2010 were analysed for antigenic relationships with various vaccine strains by 2dmVNT and/or LPBE. All four isolates from Iran showed a close match with A TUR 06 but not with all other tested vaccine strains except one which matched with A IND 17/82. The isolate from Nigeria was antigenically close to A Eri 98, A TUR 06 and A IND 17/82 but not to all other vaccine strains. Two isolates from Pakistan were close match with A22 Irq and A SAU 41/91 strains. Both isolates from Tanzania showed a close match with Eri 98 but only one matched with A22 Irq, A SAU 41/91 and A TUR 06 (Table C).

Two FMDV type SAT2 virus (see table C, Type SAT2 for details) from Kenya and Tanzania collected in 2009 were antigenically matched with SAT2 3218 strain, but only one isolate was a close match with SAT2 ZIM vaccine strain (Table C).

Annex 1.

TABLE A: Clinical sample diagnostics made by the WRL between July and September 2010

Country	WRL for FMD Sample Identification	Animal	Date of Collection	Results		
				VI/ELISA	RT-PCR	Final report
AFGHANISTAN**	AFG 29/2010	NK	01.02.10	NVD	Positive	FMDV GD ^a
	AFG 30/2010	NK	08.02.10	Not done	Positive	FMDV GD ^a
	AFG 31/2010	NK	04.03.10	Not done	Positive	FMDV GD ^a
	AFG 32/2010	NK	09.03.10	Not done	Positive	FMDV GD ^a
	AFG 33/2010	NK	15.03.10	Not done	Negative	NVD
	AFG 34/2010	NK	24.03.10	Not done	Positive	FMDV GD ^a
	AFG 35/2010	NK	24.03.10	Not done	Positive	FMDV GD ^a
	AFG 36/2010	NK	24.03.10	Not done	Positive	FMDV GD ^a
	AFG 37/2010	NK	24.03.10	Not done	Positive	FMDV GD ^a
	AFG 38/2010	NK	24.03.10	Not done	Positive	FMDV GD ^a
	AFG 39/2010	NK	06.04.10	Not done	Positive	FMDV GD ^a
	AFG 40/2010	NK	12.04.10	Not done	Positive	FMDV GD ^a
	AFG 41/2010	NK	14.04.10	Not done	Positive	FMDV GD ^a
	AFG 42/2010	NK	14.04.10	Not done	Positive	FMDV GD ^a
	AFG 43/2010	NK	15.04.10	Not done	Positive	FMDV GD ^a
	AFG 44/2010	NK	22.04.10	Not done	Positive	FMDV GD ^a
	AFG 45/2010	NK	22.04.10	Not done	Positive	FMDV GD ^a
	AFG 46/2010	NK	03.05.10	Not done	Positive	FMDV GD ^a
	AFG 47/2010	NK	03.05.10	Not done	Positive	FMDV GD ^b
	AFG 48/2010	NK	06.05.10	Not done	Positive	FMDV GD ^b

AFG 49/2010	NK	06.05.10	Not done	Positive	FMDV GD ^b
AFG 50/2010	NK	08.05.10	Not done	Positive	FMDV GD ^a
AFG 51/2010	NK	08.05.10	Not done	Positive	FMDV GD ^c
AFG 52/2010	NK	08.05.10	Not done	Positive	FMDV GD ^a
AFG 53/2010	NK	08.05.10	Not done	Positive	FMDV GD ^a
AFG 54/2010	NK	08.05.10	Not done	Positive	FMDV GD ^b
AFG 55/2010	NK	09.05.10	Not done	Positive	FMDV GD ^a
AFG 56/2010	NK	09.05.10	Not done	Positive	FMDV GD ^a
AFG 57/2010	NK	09.05.10	Not done	Positive	FMDV GD ^a
AFG 58/2010	NK	09.05.10	Not done	Positive	FMDV GD ^a
AFG 59/2010	NK	14.05.10	Not done	Positive	FMDV GD ^a
AFG 60/2010	NK	14.05.10	Not done	Positive	FMDV GD ^a
AFG 61/2010	NK	14.05.10	Not done	Positive	FMDV GD ^a
AFG 62/2010	NK	14.05.10	Not done	Positive	FMDV GD ^a
AFG 63/2010	NK	14.05.10	Not done	Positive	FMDV GD ^a
AFG 64/2010	NK	14.05.10	Not done	Positive	FMDV GD ^a
AFG 65/2010	NK	15.05.10	Not done	Positive	FMDV GD ^a
AFG 66/2010	NK	15.05.10	Not done	Positive	FMDV GD ^a
AFG 67/2010	NK	15.05.10	Not done	Positive	FMDV GD ^a
AFG 68/2010	NK	15.05.10	Not done	Positive	FMDV GD ^a
AFG 69/2010	NK	15.05.10	Not done	Positive	FMDV GD ^a
AFG 70/2010	NK	15.05.10	Not done	Positive	FMDV GD ^a
AFG 71/2010	NK	17.05.10	Not done	Positive	FMDV GD ^a
AFG 72/2010	NK	17.05.10	Not done	Positive	FMDV GD ^a
AFG 73/2010	NK	17.05.10	Not done	Positive	FMDV GD ^a
AFG 74/2010	NK	19.05.10	Not done	Positive	FMDV GD ^a
AFG 75/2010	NK	15.06.10	Not done	Positive	FMDV GD ^a
AFG 76/2010	NK	15.06.10	Not done	Positive	FMDV GD ^a
AFG 77/2010	NK	15.06.10	Not done	Negative	NVD
AFG 78/2010	NK	15.06.10	Not done	Positive	FMDV GD ^a
AFG 79/2010	NK	15.06.10	Not done	Positive	FMDV GD ^a
AFG 80/2010	NK	15.06.10	Not done	Positive	FMDV GD ^a
AFG 81/2010	NK	15.06.10	Not done	Positive	FMDV GD ^a
AFG 82/2010	NK	15.06.10	Not done	Positive	FMDV GD ^a
AFG 83/2010	NK	15.06.10	Not done	Positive	FMDV GD ^a
AFG 84/2010	NK	15.06.10	Not done	Negative	NVD
AFG 85/2010	NK	15.06.10	Not done	Positive	FMDV GD ^a
AFG 86/2010	NK	21.06.10	Not done	Positive	FMDV GD ^a
AFG 87/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
AFG 88/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
AFG 89/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
AFG 90/2010	NK	01.01.10	Not done	Positive	FMDV GD ^b
AFG 91/2010	NK	01.01.10	Not done	Positive	FMDV GD ^c
AFG 92/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
AFG 93/2010	NK	01.01.10	NVD	Positive	FMDV GD ^a

	AFG 94/2010	NK	01.01.10	Not done	Positive	FMDV GD ^b
	AFG 95/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
	AFG 96/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
	AFG 97/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
	AFG 98/2010	NK	01.01.10	NVD	Negative	NVD
	AFG 99/2010	NK	01.01.10	NVD	Negative	NVD
	AFG 100/2010	NK	01.01.10	Not done	Negative	NVD
	AFG 101/2010	NK	01.01.10	Not done	Negative	NVD
	AFG 102/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
	AFG 103/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
	AFG 104/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
	AFG 105/2010	NK	01.01.10	Not done	Positive	FMDV GD ^b
	AFG 106/2010	NK	01.01.10	Not done	Positive	FMDV GD ^b
	AFG 107/2010	NK	01.01.10	Not done	Negative	NVD
	AFG 108/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
	AFG 109/2010	NK	01.01.10	Not done	Positive	FMDV GD ^a
IRAN	IRN 174/2010	Sheep	21.07.10	O	Positive	O
	IRN 175/2010	Cattle	26.07.10	O	Positive	O
	IRN 176/2010	Cattle	02.08.10	A	Positive	A
	IRN 177/2010	Cattle	15.08.10	NVD	Positive	FMDV GD
	IRN 178/2010	Cattle	21.08.10	O	Positive	O
	IRN 179/2010	Cattle	22.08.10	O	Positive	O
	IRN 180/2010	Cattle	22.08.10	O	Positive	O
	IRN 181/2010	Cattle	23.08.10	O	Positive	O
	IRN 182/2010	Cattle	23.08.10	O	Positive	O
	IRN 183/2010	Cattle	27.08.10	O	Positive	O
	IRN 184/2010	Sheep	28.08.10	O	Positive	O
	IRN 185/2010	Cattle	28.08.10	A	Positive	A
	IRN 186/2010	Goat	30.08.10	O	Positive	O
	IRN 187/2010	Cattle	31.08.10	O	Positive	O
	IRN 188/2010	Cattle	12.09.10	A	Positive	A
PAKISTAN	PAK 25/2010	Cattle	01.07.10	O	Positive	O
	PAK 26/2010	Buffalo	01.07.10	O	Positive	O
	PAK 27/2010	Buffalo	01.07.10	NVD	Positive	FMDV GD
	PAK 28/2010	Buffalo	01.07.10	O	Positive	O
	PAK 29/2010	Buffalo	05.07.10	O	Negative	O
	PAK 30/2010	Cattle	05.07.10	NVD	Positive	FMDV GD
	PAK 31/2010	Buffalo	05.07.10	O	Positive	O
	PAK 32/2010	Cattle	05.07.10	NVD	Positive	FMDV GD
	PAK 33/2010	Cattle	24.07.10	NVD	Positive	FMDV GD
	PAK 34/2010	Cattle	29.07.10	NVD	Positive	FMDV GD
	PAK 35/2010	Cattle	29.07.10	O	Positive	O
	PAK 36/2010	Cattle	29.07.10	O	Positive	O
	PAK 37/2010	Buffalo	30.07.10	OA	Positive	OA
	PAK 38/2010	Buffalo	30.07.10	NVD	Positive	FMDV GD
	PAK 39/2010	Buffalo	30.07.10	NVD	Positive	FMDV GD
	PAK 40/2010	Buffalo	30.07.10	O	Positive	O
	PAK 41/2010	Buffalo	01.08.10	NVD	Negative	NVD
	PAK 42/2010	Cattle	12.08.10	O	Positive	O
	PAK 43/2010	Buffalo	17.08.10	NVD	Positive	FMDV GD
	PAK 44/2010	Buffalo	17.08.10	NVD	Positive	FMDV GD

	PAK 45/2010	Buffalo	17.08.10	NVD	Positive	FMDV GD
SENEGAL	SEN 1/2010	Sheep	08.06.10	NVD	Negative	NVD
	SEN 2/2010	Sheep	08.06.10	NVD	Negative	NVD
	SEN 3/2010	Sheep	08.06.10	NVD	Negative	NVD
	SEN 4/2010	Sheep	08.06.10	NVD	Negative	NVD
TURKEY	TUR 7/2010	Gazelle	NK	NVD	Positive	FMDV GD
	TUR 8/2010	Cattle	NK	NVD	Positive	FMDV GD
	TUR 9/2010	Sheep	16.05.10	O	Positive	O
	TUR 10/2010	Cattle	03.06.10	O	Positive	O
	TUR 11/2010	Cattle	17.06.10	O	Positive	O
	TUR 12/2010	Cattle	17.06.20	O	Positive	O
	TUR 13/2010	Sheep	NK	NVD	Negative	NVD
	TUR 14/2010	Goat	29.06.10	NVD	Negative	NVD
	TUR 15/2010	Cattle	NK	NVD	Negative	NVD
	TUR 16/2010	Cattle	07.07.10	NVD	Positive	FMDV GD
	TUR 17/2010	Cattle	09.07.10	NVD	Positive	FMDV GD
	TUR 18/2010	Cattle	09.07.10	O	Positive	O
	TUR 19/2010	Cattle	11.07.10	NVD	Positive	FMDV GD
	TUR 20/2010	Cattle	13.07.10	A	Positive	A
	TUR 21/2010	Cattle	15.07.10	O	Positive	O
	TUR 22/2010	Cattle	16.07.10	O	Positive	O
	TUR 23/2010	Sheep	19.07.10	O	Positive	O
	TUR 24/2010	Sheep	20.07.10	NVD	Positive	FMDV GD
	TUR 25/2010	Cattle	21.07.10	NVD	Positive	FMDV GD
	TUR 26/2010	Cattle	23.07.10	O	Positive	O
	TUR 27/2010	Cattle	26.07.10	O	Positive	O
	TUR 28/2010	Cattle	26.07.10	A	Positive	A
	TUR 29/2010	Cattle	02.08.10	O	Positive	O
	TUR 30/2010	Cattle	09.08.10	O	Positive	O
	TUR 31/2010	Cattle	12.08.10	O	Positive	O
	TUR 32/2010	Cattle	12.08.10	O	Positive	O
	TUR 33/2010	Cattle	13.08.10	O	Positive	O
	TUR 34/2010	Cattle	13.08.10	A	Positive	A
	TUR 35/2010	Cattle	13.08.10	O	Positive	O
	TUR 36/2010	Cattle	13.08.10	O	Positive	O
	TUR 37/2010	Cattle	14.08.10	O	Positive	O
	TUR 38/2010	Cattle	15.08.10	O	Positive	O
	TUR 39/2010	Cattle	15.08.10	O	Positive	O

TOTAL : 154

**

the majority of samples from Afghanistan were supplied in RNA later for PCR analysis and virus serotypes were defined by sequencing

FMD(V)
GD

foot-and-mouth disease (virus)
genome detected

^a

FMDV serotype O identified by unvalidated type-specific RT-PCR assay

^b

FMDV serotype A identified by unvalidated type-specific RT-PCR assay

^c

FMDV serotypes O and A identified by unvalidated type-specific RT-PCR assay

VI/ELISA

FMDV serotype identified following virus isolation in cell culture and antigen ELISA
reverse transcription polymerase chain reaction on epithelial suspension for FMD viral

RT-PCR

genome

NVD

no foot-and-mouth disease, swine vesicular disease or vesicular stomatitis virus detected

TABLE B: Summary of samples collected and received to IAH-Pirbright (July-September 2010)

Country	No. of samples	Virus isolation in cell culture/ELISA								RT-PCR for FMD (or SVD) virus (where appropriate)		
		FMD virus serotypes							NVD	NT	Positive	Negative
		O	A	C	SAT 1	SAT 2	SAT 3	Asia 1				
AFGHANISTAN**	81	-	-	-	-	-	-	-	4	77	73	8
IRAN	15	11	3	-	-	-	-	-	1	-	15	-
PAKISTAN***	21	10	1	-	-	-	-	-	11	-	19	2
SENEGAL	4	-	-	-	-	-	-	-	4	-	-	4
TURKEY	33	20	3	-	-	-	-	-	10	-	30	3
TOTAL	154	41	7	-	-	-	-	-	30	77	137	17

** all but 4 samples from Afghanistan were supplied in RNA later for PCR analysis

*** one sample from Pakistan contained a mixture of type O and A FMDVs

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

RT-PCR reverse transcription polymerase chain reaction for FMD (or SVD) viral genome

TABLE C: Antigenic characterisation of FMD field isolates by matching with vaccine strains by VNT and/or LPBE – r1 value data from 1st July to 30th September 2010**Type O:**

r1 values by 2dmVNT and LPBE for type O virus –WRL, Pirbright													
Vaccine strains	O 4174	O 4625	O BFS		O Campos	O Hkn 6/83	O Ind 53/79	O Ind R2/75	O Isr 2/88	O Manisa		O Tai 189/87	O Taw98
WRL ref for virus	LPBE	VNT	LPBE	VNT	VNT	LPBE	LPBE	VNT	LPBE	LPBE	VNT	LPBE	VNT
Ecu 01/2010		0.16		0.10	0.23			0.12		0.13	0.05		0.02
Ecu 09/2010				0.06	0.17			0.12		0.08	0.06		0.04
Irn 05/2010			0.21	0.52				0.61		0.67	0.27		0.48
Irn 08/2010	0.54		0.38	0.87				>1.0		0.44	0.72		>0.85
Irn 17/2010	≥0.75	0.55	0.29	0.40				0.85		0.40	0.19		0.31
Irn 27/2010	0.28		0.25	0.36				>0.78		0.38	0.26		0.38
Irn 33/2010	1		0.32	0.48				>0.94		0.38	0.25		0.46
Irn 44/2010	0.44		0.63	0.39				0.91		0.75	0.29		0.31
Irn 49/2010			0.32	0.29				>1.0		0.15	0.25		0.67
Irn 89/2009			0.20	0.45				>0.76		≥0.75	0.27		0.73
Pak 01/2010			0.30	0.34	0.74		0.50	>0.95		0.38	0.46	0.59	0.60
Pak 20/2010		0.55	0.10	0.11	0.31	0.21	0.42	0.61	0.06	0.38	0.19	1.00	0.21
UAE 02/2010			0.36	0.31	0.72	0.50	1.00	0.90		0.50	0.39	≥1.00	0.38
UAE 04/2010			0.22	0.23	0.72	0.50	0.84	>1.0		0.50	0.32	1.00	0.38

Type A:

r ₁ values by 2dmVNT and LPBE for type A virus --WRL, Pirbright										
Vaccine strains	A Eri98		A Ind 17/82	A Irn 87		A Irn96	A22 Irq		A SAU 41/91	A Tur06
WRL ref for virus	LPBE	VNT	VNT	LPBE	VNT	VNT	LPBE	VNT	VNT	VNT
Irn 36/2010		0.17	0.55					0.12	0.13	0.37
Nig 38/2009		0.68	0.38					0.16	0.09	0.19
Pak 12/2010		0.19	0.09					0.53	0.31	0.85
Pak 24/2010		0.23	0.08					0.34	0.47	0.69
Tan 11/2009		0.37	0.20					0.14	0.19	0.10
Tan 42/2009		0.52	0.06					0.33	0.38	0.32
Irn 73/2010		0.20	0.21	0.08	0.11	0.17*	0.19	0.24	0.12	>0.68
Irn 80/2010	0.22	0.22	0.22	0.15	0.16	0.15*	0.16	0.23	0.09	0.44
Irn 125/2010	0.06	0.08	0.09	0.05	0.05	0.05*	0.25	0.24	0.27	>0.68

Type SAT2:

r ₁ values by 2dmVNT for type SAT2 virus --WRL, Pirbright		
Vaccine strains	SAT2 3218	SAT2 ZIM
WRL ref for virus	VNT	VNT
Ken 122/2009	0.41	0.42
Tan 43/2009	0.38	0.19

Interpretation of r₁ valuesIn the case of VNT:

$r_1 \geq 0.3$. 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.

$r_1 < 0.3$. Suggests that the field isolate is so different from the vaccine strain that the vaccine is unlikely to protect

In the case of LPB ELISA:

$r_1 = 0.4-1.0$. 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.

$r_1 = 0.2-0.39$. Suggests that the field isolate is antigenically related to the vaccine strain. The vaccine strain might be suitable for use if no closer match can be found provided that a potent vaccine is used and animals are preferably immunised more than once.

$r_1 < 0.2$. Suggests that the field isolate is so different from the vaccine strain that the vaccine is unlikely to protect

Annex 2. Recent FMD Publications cited by PubMed

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Annex 3. RECOMMENDATIONS FROM WRLFMD ON FMD VIRUS STRAINS TO BE INCLUDED IN FMDV ANTIGEN BANKS – September 2010

High Priority

O Manisa (*covers panAsian topotype*)
O BFS or Campos
A24 Cruzeiro
Asia 1 Shamir
A Iran-05
A22 Iraq
SAT 2 Saudi Arabia (*or equivalent*)

(not in order of importance)

Medium Priority

A Eritrea
A Iran '96
SAT 2 Zimbabwe
A Iran 87 or A Saudi Arabia 23/86 (*or equivalent*)
SAT 1 South Africa
A Malaysia 97 (*or Thai equivalent such as A/NPT/TAI/86*)
A Argentina 2001
O Taiwan 97 (*pig-adapted strain or Philippine equivalent*)
A Iran '99

(not in order of importance)

Low Priority

A15 Bangkok related strain
A87 Argentina related strain
C Noville
SAT 2 Kenya
SAT 1 Kenya
SAT 3 Zimbabwe
A Kenya

(not in order of importance)