

OIE/FAO World Reference Laboratory Report¹
January-March 2009

Foot-and-Mouth Disease

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Summary

There were no outbreaks officially reported in FMD-free countries that did not practice vaccination between January and March 2009.

FMD type A in the Middle East and Libya

In the Middle East the A-Iran-05 strain continues to evolve and spread to previously unaffected countries. During the present reporting period it has appeared for the first time in Iraq, Kuwait, Lebanon and Libya and has continued to cause outbreaks in Bahrain, Iran, Pakistan and Turkey. During the past two years four distinct sub-lineages have been recognised and named A-Iran-05^{ARD-07}, A-Iran-05^{EZM-07}, A-Iran-05^{AFG-07} and A-Iran-05^{BAR-08}. The first two have evolved within Turkey and have not spread to the rest of the Middle East. A-Iran-05^{AFG-07} has appeared in Afghanistan (2007), Iran (2008-2009), Pakistan (2008-2009) and Bahrain (2009). A-Iran-05^{BAR-08} has become the most widespread sub-lineage appearing in Bahrain (2008), Iran (2009), Pakistan (2009), Lebanon (2009), Iraq (2009), Kuwait (2009) and Libya (2009).

FMD type A in Egypt

FMDV type A has re-appeared in Egypt after an apparent absence of approximately two years. Phylogenetic analysis has demonstrated a close relationship with previous outbreaks in that country in 2006. It is not clear if the virus has persisted undetected in Egypt or if a new introduction from the same source as the 2006 epidemic has taken place.

FMD type A in China

In January 2009, FMD type A appeared in the People's Republic of China for the first time since the early 1960's. Phylogenetic analysis has shown a close link to viruses from Southeast Asia suggesting one or more recent introductions into China.

FMD type O in Taiwan

In February 2009, Taiwan reported the first outbreak of type O since 2001. The disease was found in sentinel non-vaccinated pigs but no other information or samples have reached WRLFMD.

FMD type O in the Middle East

The PanAsia-2 strain (ME-SA topotype) continues to dominate in the region with viruses being isolated from Iran, Pakistan and Turkey. However, in late 2008-early 2009, viruses belonging to the Ind-2001 strain (also ME-SA topotype) appeared in wildlife (gazelle and black buck) in the United Arab Emirates.

FMD types SAT 1 and SAT 2 in Zambia

Both serotypes continue to cause problems in Zambia and it is not clear whether these are introductions from neighbouring countries or transmission from indigenous African buffalo populations.

Uncharacterised FMD viruses

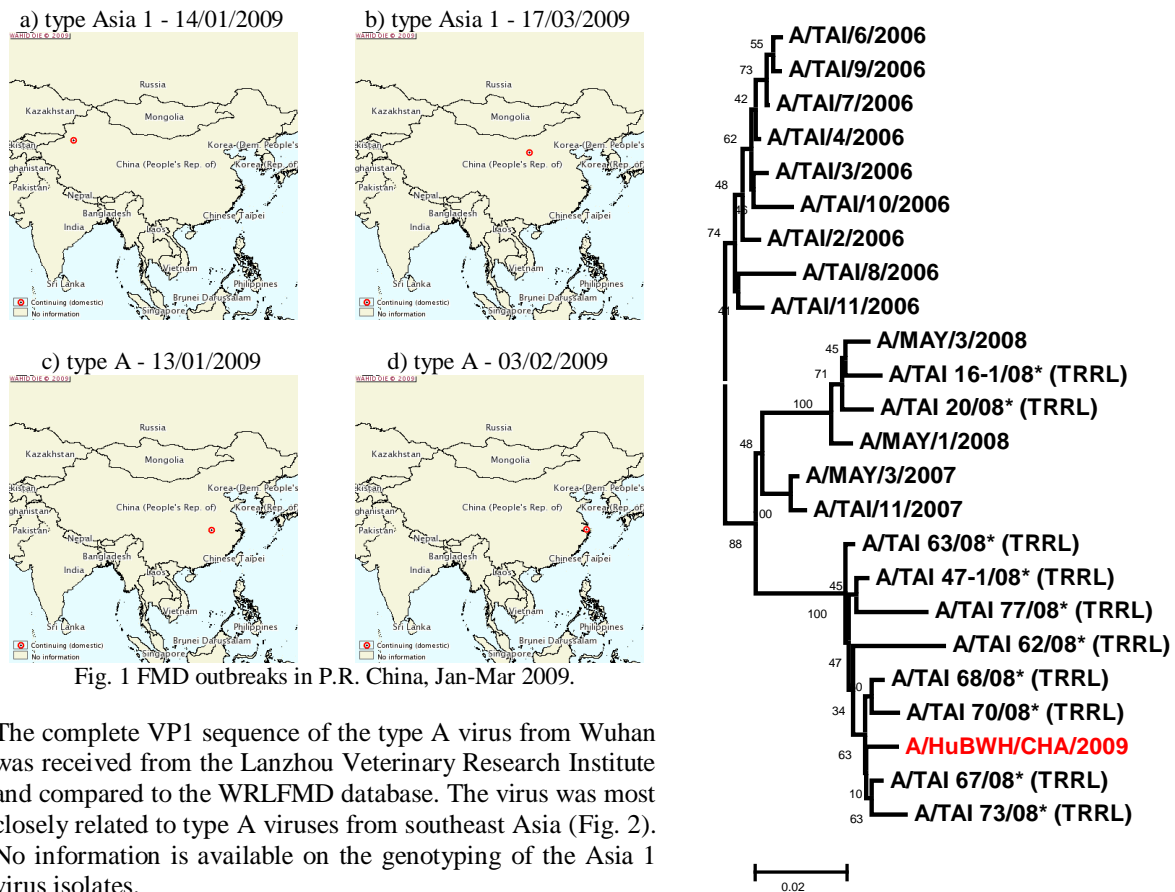
A number of other outbreaks have occurred where samples have not been sent to the WRLFMD. It is probable that the countries involved have performed their own genetic characterisation, however, we would also like to encourage the submission of samples (or complete VP1 sequences) to the WRLFMD.

WRL vaccine recommendations have been amended from the previous report (Annex 4) to take into account the continued spread and dominance of the FMDV serotype A Iran 05 strain and its consistently poor antigenic match to A22 Iraq vaccine. It is recommended that a more suitable alternative for the A Iran 05 strain should be identified and tested for efficacy by WRLFMD, but that A22 Iraq remain at high priority, since good quality, high potency emergency A22 Iraq vaccine should offer some protection against this strain.

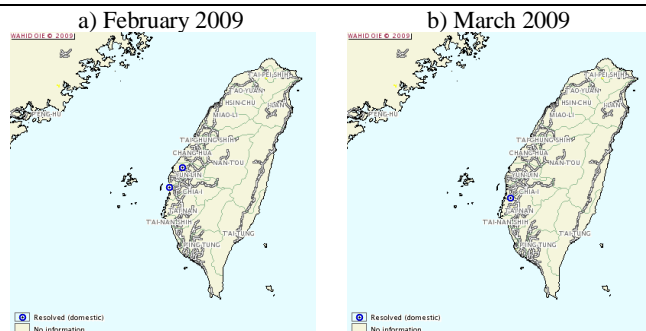
Detailed Disease Information

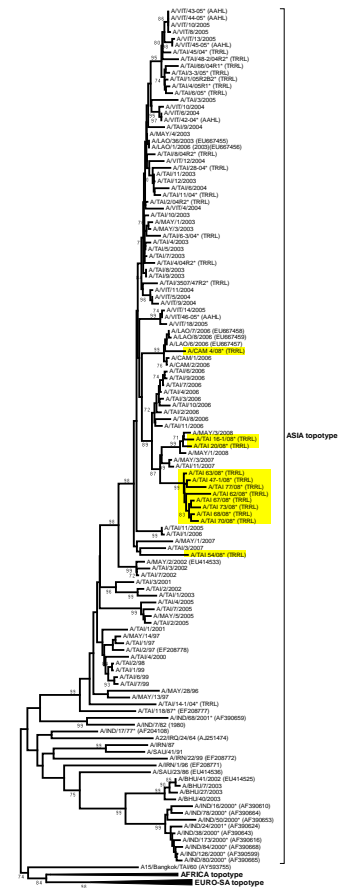
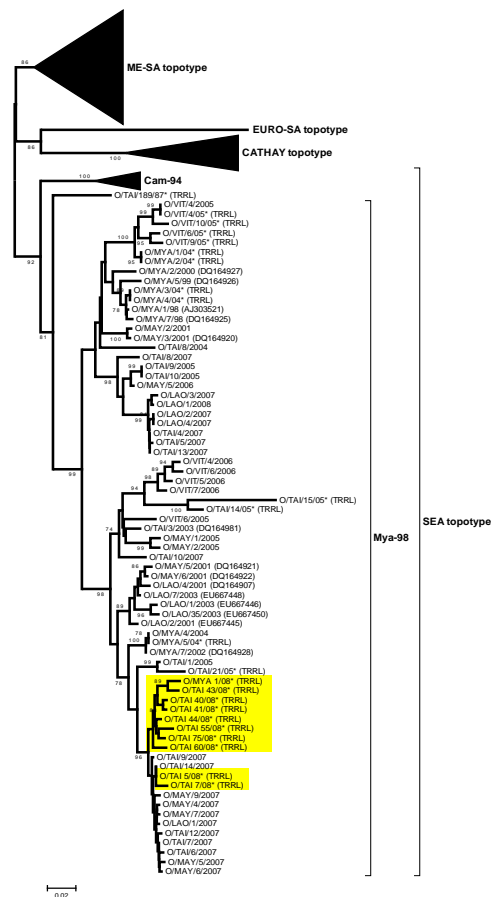
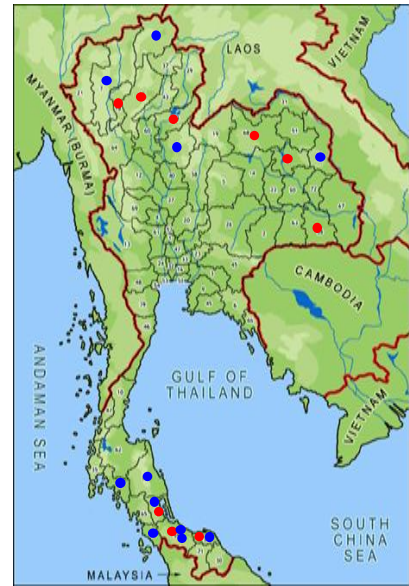
ASIA – Far East & Southeast Asia

People's Republic of China: On 14th January, an outbreak of FMD type Asia 1 was reported in cattle in Erbatai, Kuche, Xinjiang province (Fig. 1a). On 17/03/2009 another outbreak of type Asia 1 was found in cattle at Sumitu Sumu, Etuoke, E'erduosi, Inner Mongolia (Fig. 1b). On the 13/01/2009, FMD type A was detected in cattle in Sunwan, Dongxihu, Wuhan, Hubei province (Fig. 1c). A second outbreak due to type A was found on 03/02/2009 at Wusi, Fen Xian, Shanghai, again in cattle (Fig. 1d).



Taiwan Province of China: In February, FMD type O was detected in pigs at Maoliao Township, Yun-Lin (04/02/2009) and Beidou Town, Chang-Hua (09/02/2009) (Fig. 3a). On 27/03/2009 another outbreak due to type O was reported in pigs at Singang Township, Chia-I (Fig. 3b). No information is available as to the genetic identity of this strain and samples have not been submitted to the WRLFMD.





Cambodia: A single FMDV type A VP1 sequence, designated CAM4/08, was received from the TRRL on 03/03/2009. The location of the outbreak within Cambodia was not specified. Genetically it clustered with Cambodian and Lao viruses from 2006 (Fig. 10).

Myanmar: A single FMDV type O VP1 sequence, designated MYA1/08, was received from the TRRL on 03/03/2009. The location of the outbreak within Myanmar was not specified. Reported outbreaks in Myanmar in 2008 are shown in Fig. 11. Genetically it clustered with Thai viruses from 2008 (Fig. 9).



Fig. 11. FMD type O outbreaks in Myanmar during 2008.

ASIA – Middle East

Bahrain: Four samples were received on 21/01/2009 from Alie, Middle Governorate, Bahrain (Fig. 12). Two were identified as FMDV type A and two as FMDV-GD. Phylogenetic analysis showed them to belong to the Iran-05 strain (ASIA toptype). The Bahrain 2009 viruses were distinct from those received in 2008, suggesting separate introductions. These two sub-lineages were later named A-Iran-05AFG-07 and A-Iran-05BAR-08 (see Fig. 23).

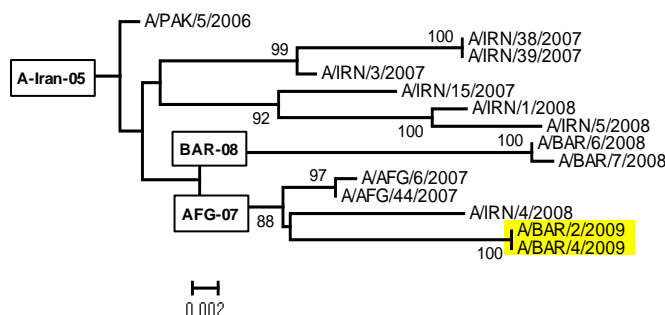


Fig. 13. Relationships between FMDV A isolates from Bahrain in 2008-9.

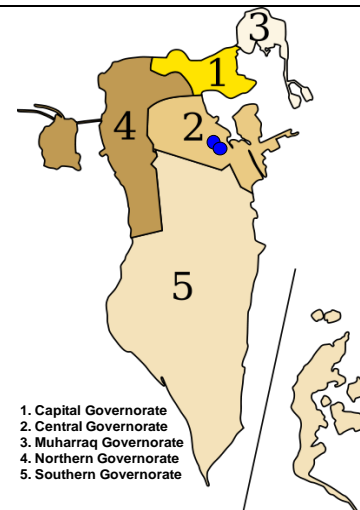


Fig. 12. Location of FMDV type A in Bahrain in 2009.

Iraq: Two batches of samples were received on 28/01/2009 (n=20) and 15/02/2009 (n=5) which had been taken from cattle between 12th January and 9th March 2009 in Iraq. Seven type A viruses were isolated from the first batch while four were only positive by real-time RT-PCR (Al Muthanna governorate). Four out of five samples from the second batch were typed as FMDV type A (Al Markazi, Denyanyah and Al-Suwarau, Wasit) and the fifth as FMDV-GD (Baghdad) (Fig. 14). Phylogenetic analysis showed them to belong to the A-Iran-05 strain (ASIA topotype) (Fig. 15). This sub-lineage was later named A-Iran-05^{BAR-08} (see Fig. 23).

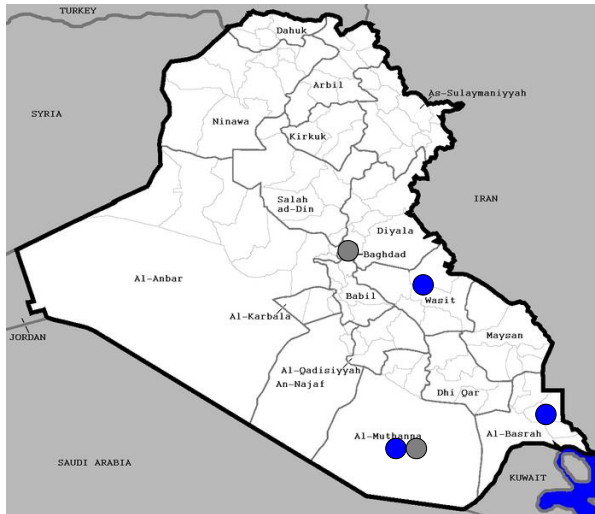


Fig. 14. Location of FMDV type A (blue) and FMDV-GD (grey) in Iraq in 2009.

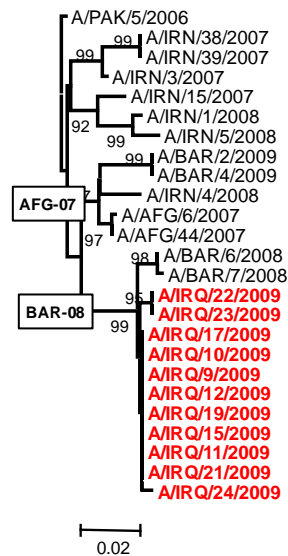


Fig. 15. Relationships between FMD A viruses from Iraq in 2009.

Great thanks are expressed to Major Nicole Chevalier, DVM, US Army, Deputy Commander, 64th Medical Detachment (Veterinary Services) and her team and members of the Iraq veterinary services for the collection and dispatch of samples.

Iran: On 26/02/2009 29 samples were received from various locations in Iran (Fig. 16). Twenty-seven of the samples were identified as type A and two as type O. Phylogenetic analysis of the type A VP1 sequences showed they belonged to one of two sub-lineages of the A-Iran-05 strain, A-Iran-05^{AFG-07} and A-Iran-05^{BAR-08} (see Fig. 23). The two type O viruses belonged to the PanAsia-2 strain (ME-SA topotype) and were most closely related to viruses from Pakistan in 2007 (Fig. 18).

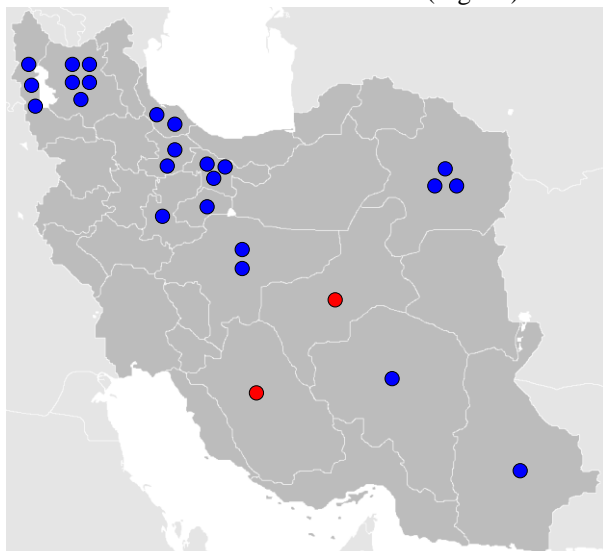


Fig. 16. Location of 26 samples received from Iran (the location of three type A viruses was not supplied).

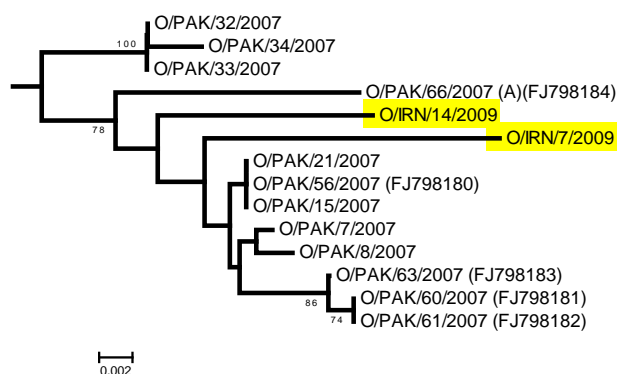


Fig. 18. Relationships between O Iran 2009 and O Pakistan 2007 viruses belonging to the PanAsia-2 strain.



Fig. 17. Relationships between A Iran 2009 viruses belonging to the A-Iran-05 strain.

Israel: On 1st February an outbreak of FMD was detected in cattle at Bet Halewi, HaSharon, Hamerkaz and identified at the Kimron Veterinary Institute as type O (Fig. 19a). A second outbreak was identified on 11/02/2009 at Ilut, Kineret, Hazafon, this time in sheep and goats (Fig. 19b). Further outbreaks occurred at Arbel, Kineret, Hazafon (22/02/2009; sheep), Shefar'am, Acco, Hazafon (26/02/2009; cattle), Grifat-Zarzir, Yizreel, Hazafon (08/03/2009; cattle and sheep), Ar'ara, Hadera, Haifa (07/03/2009; cattle) and Kefar Yehoshua, Yizreel, Hazafon (09/03/2009; goats) (Fig. 19c & d). No samples have been received by the WRLFMD.

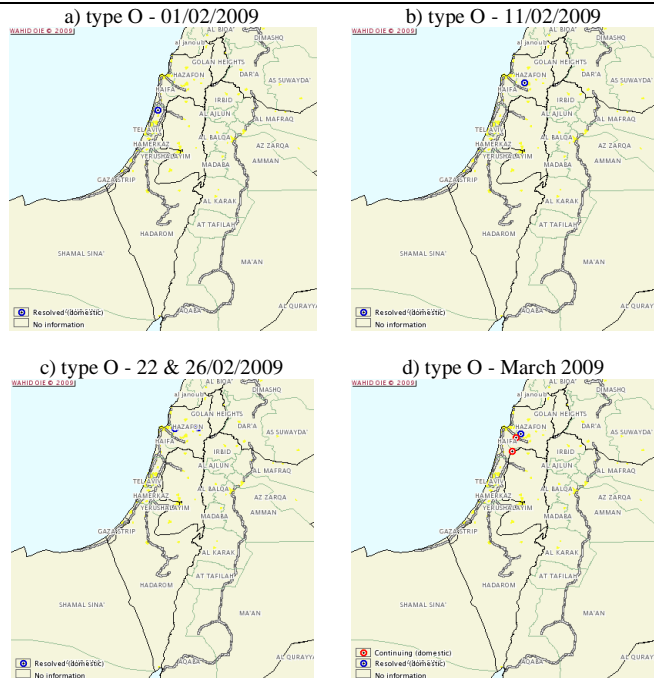


Fig. 19. Location of outbreaks of FMD type O in Israel, Jan-Mar 2009.

Kuwait: Six samples were received by the WRLFMD on 11/02/2009. FMDV type A was isolated from all the samples which were collected from cattle in Kabed (n=2) and Solybia (n=4). All six viruses belonged to the A-Iran-05^{BAR-08} sub-lineage (Fig. 17).

Lebanon: Eleven outbreaks were identified between 19/01/2009 and 10/02/2009 in cattle in various locations in the Al Biqa' and Ash Shamal regions (Fig. 20). FMD type A was identified in four samples sent to the WRLFMD. Phylogenetic analysis showed them to belong to the A-Iran-05 strain (ASIA toptotype) (Fig. 21). This sub-lineage was later named A-Iran-05^{BAR-08} (see Fig. 23).

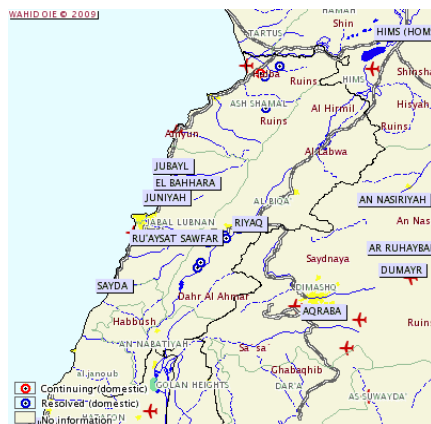


Fig. 20. Location of FMD type A outbreaks in Lebanon, Jan-Feb 2009.

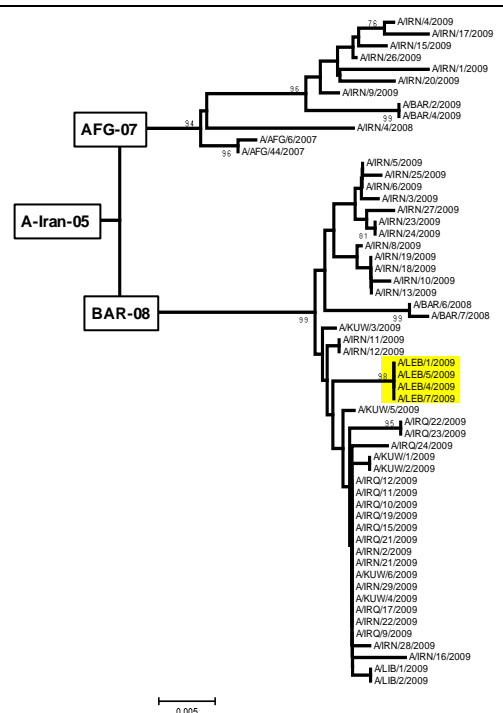


Fig. 21. Relationships between FMD type A viruses from Lebanon.

Pakistan: On 27/03/2009 a batch of 12 samples was received from Pakistan. Eight were from Sindh province (from buffalo) and four were from Punjab province (from cattle) (Fig. 22). One sample from Sindh was identified as type O, eight samples (five from Sindh and three from the Punjab) were identified as type A and two samples from Sindh were Asia 1. However, no live virus could be isolated from the Asia 1 samples. Phylogenetic analysis of the type A viruses showed that seven belonged to the A-Iran-05^{AFG-07} sub-lineage and one to the A-Iran-05^{BAR-08} sub-lineage (Fig. 23). The type O virus, PAK/14/2008, belonged to the PanAsia-2 strain and was most closely related to viruses from Pakistan in 2007 and Iran in 2009 (Fig. 24). Both of the Asia 1 positive samples were amplified by RT-PCR, however, only one produced good sequence data (PAK/8/2008). This was most closely related to viruses from Afghanistan (2001) and Iran (2001 & 2004) (Fig. 25).

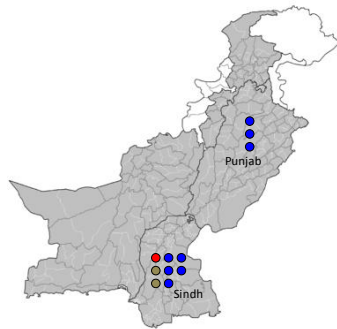


Fig. 22. FMDV types O (red), A (blue) and Asia 1 (brown) from Pakistan (2008-9).

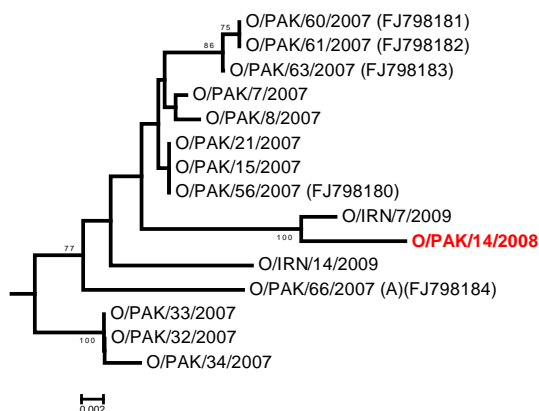


Fig. 24. Relationship of the type O Pakistan virus to other PanAsia-2 viruses.

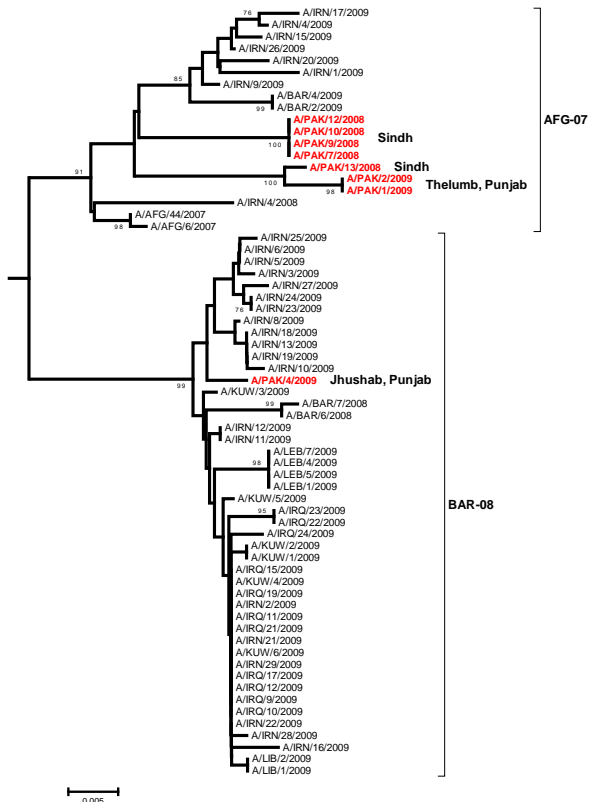


Fig. 23. Relationships between the type A Pakistan viruses.

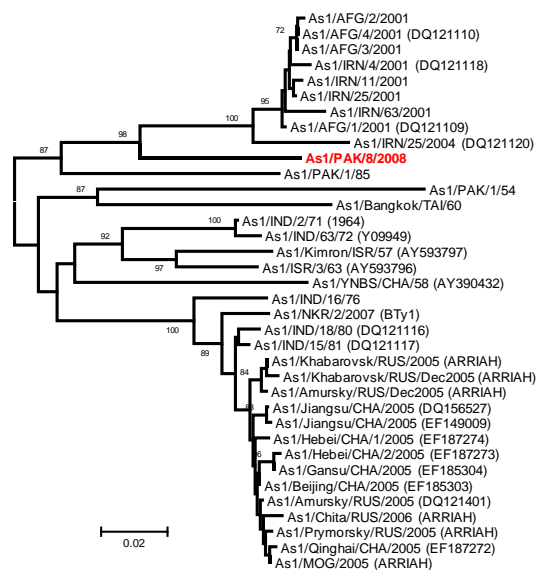


Fig. 25. Relationship of the type Asia 1 Pakistan virus to other Asia 1 viruses.

Turkey: On the 09/03/2009, 14 samples were received from various locations in Turkey, collected from cattle between Oct 2008 and Feb 2009 (Fig. 26). Four samples from 2008 and five from 2009 typed as FMDV O. Three samples from 2008 and one from 2009 typed as FMDV A. One from 2009 was FMDV-GD. Additionally, during January and February 2009, five complete VP1 sequences (two type O from 2008 and three type A from 2007, 2008 and 2009) were received from the FMD-Institute Ankara. Phylogenetic analysis of the type A viruses showed that each belonged to one of two A-Iran-05 sub-lineages, designated A-Iran-05^{ARD-07} and A-Iran-05^{EZM-07} (Fig. 27a&b). All the type O viruses were closely related to each other and belonged to the PanAsia-2 strain (ME-SA topotype) (Fig. 28).

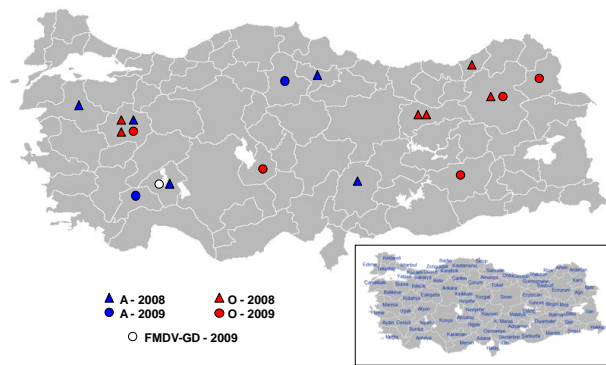


Fig. 26. Location of FMDV samples and sequences received between January and March 2009.

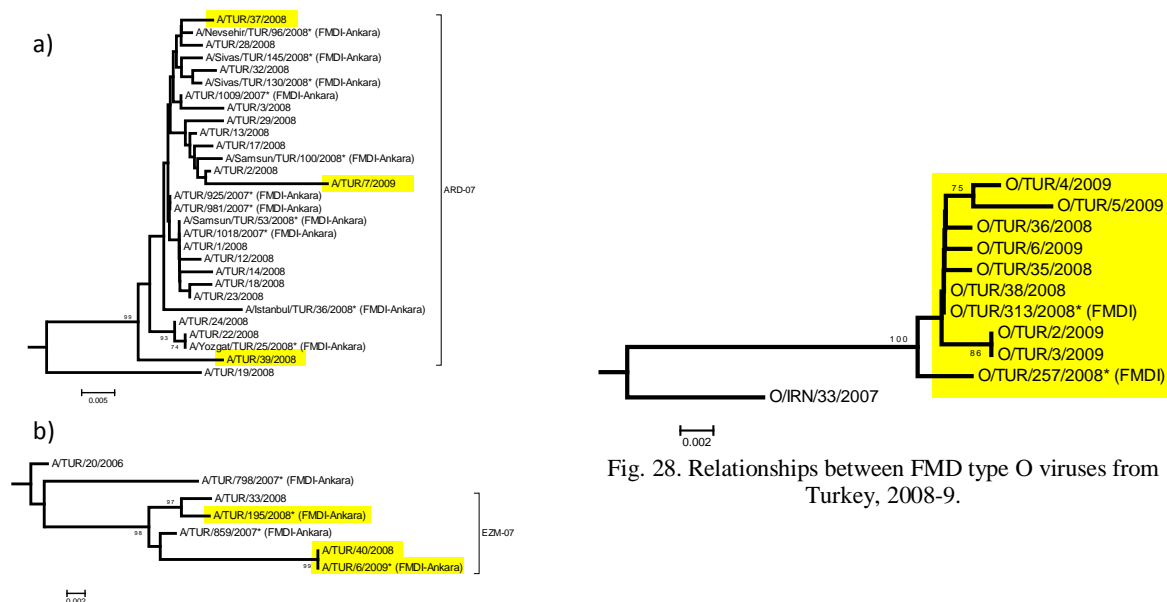


Fig. 27. Relationships between FMD type A viruses from Turkey, 2008-9.

Fig. 28. Relationships between FMD type O viruses from Turkey, 2008-9.

United Arab Emirates: Twenty-two samples were received from the UAE on the 11/02/2009. They were taken from gazelle and black buck in Dec 2008 and Jan/Feb 2009. Four samples from 2008 and five from 2009 were identified as type O, while four from 2008 and three from 2009 were FMDV-GD. Phylogenetic analysis showed all the isolates to belong to the Ind-2001 strain within the ME-SA toptotype (Fig. 29).

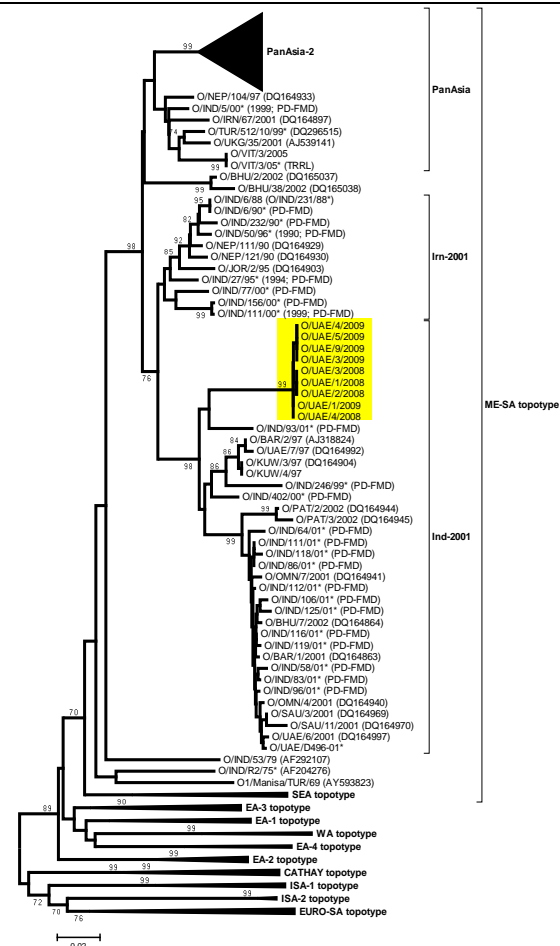


Fig. 29. Relationships between FMD type O viruses from UAE (2008-9) and other type O viruses.

Yemen Arab Republic: Seventy-four samples were received from the Yemen on 16/03/2009. Virus isolation and typing is still in progress, however, 14 type O viruses (from 2009) have so far been identified from five different locations (Fig. 30).

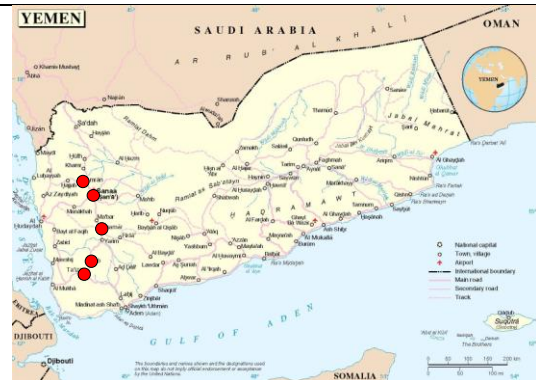


Fig. 30. Location of type O viruses identified in the Yemen Arab Republic.

AFRICA - North

Egypt: In January and February, two outbreaks of FMD type A were reported in cattle at Mena Elkamh, Ash Sharqiyah (26/01/2009) and Abo Hamad, Ash Sharqiyah (08/02/2009) (Fig. 31). On 22/01/2009 a single outbreak due to FMD type O was detected in cattle and buffalo at Damanhour, Al Buhayrah (Fig. 32). On 19/03/2009, 26 samples, collected between 2006 and 2009, were received from Egypt. Ten typed as FMDV O, nine as FMDV A, two were mixed O+A and three were FMDV-GD. The type A viruses, all from 2009 in the Sharquia Governorate, were closely related to each other and most closely related to the previous Egyptian outbreak in 2006 (Fig. 33). All the type O viruses were very closely related to the Egyptian vaccine strain O₁/Sharquia/EGY/72 (Fig. 34).



Fig. 31. Egypt - type A Jan-Feb 2009.



Fig. 32. Egypt - type O Jan 2009

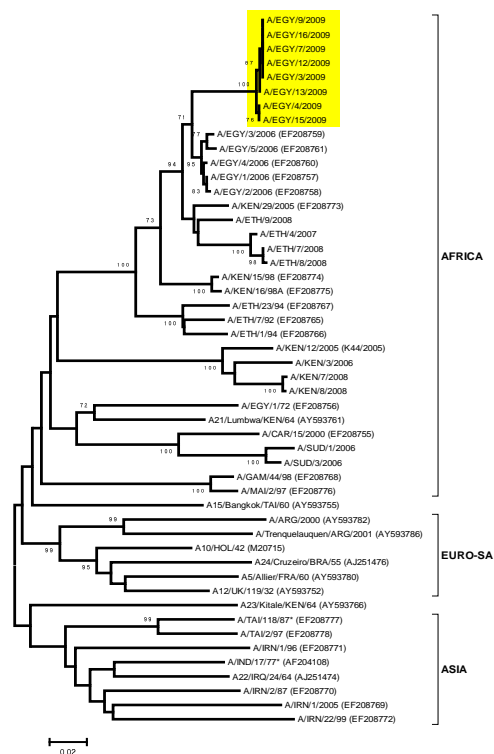


Fig. 33. Relationships between FMD type A viruses from Egypt in 2009.

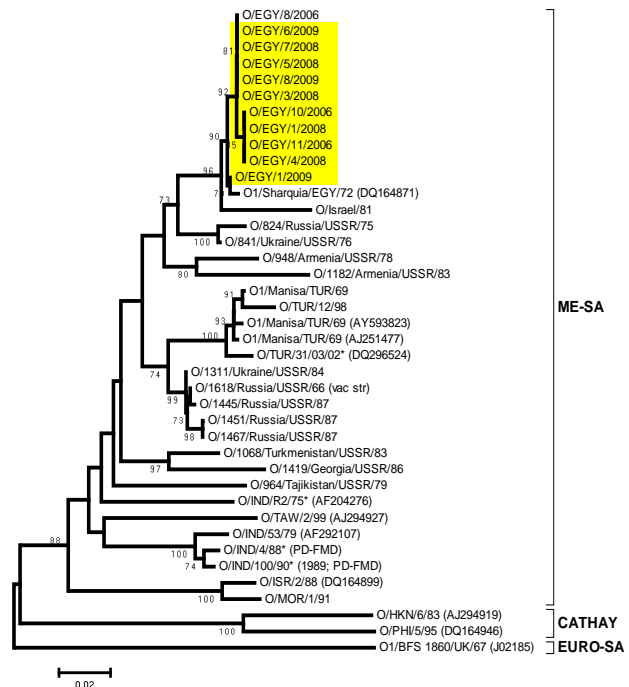


Fig. 34. Relationships between FMD type O viruses from Egypt in 2006, 2008 and 2009.

Libya: On the 12/03/2009 a batch of 117 samples was received from Libya. No locations were provided, but all samples were from cattle. Thirty-seven were identified as type A and six were FMDV-GD. Phylogenetic analysis showed them to belong to the A-Iran-05 strain (ASIA topotype) (Fig.35). This sub-lineage has been named A-Iran-05^{BAR-08} (see also Fig. 23).

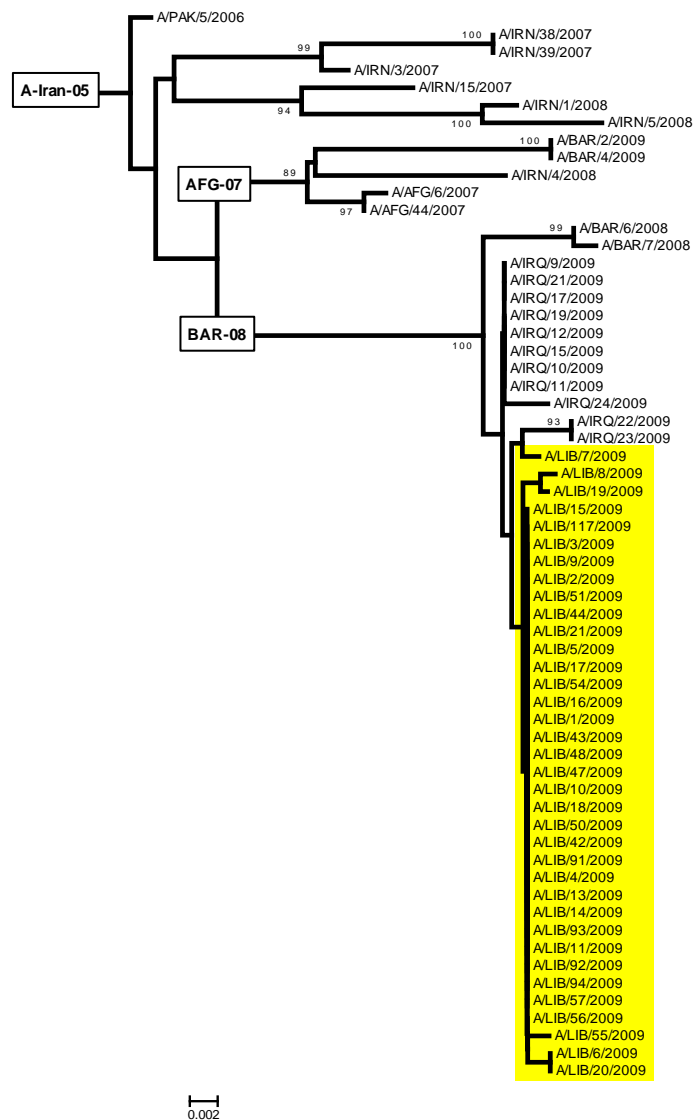


Fig. 35. Relationships between the FMD type A viruses from Libya in 2009.

AFRICA - East

Ethiopia: Nineteen samples were received by the WRLFMD on the 26/02/2009. Thirteen were typed as FMDV O and two as type A (Fig. 36); FMDV genome was detected in one sample and no virus could be detected in four samples. Phylogenetic analysis of the complete VP1 sequences showed the type O viruses from the three different regions sampled were genetically distinct from each other (Fig. 37). The two type A viruses were closely related to each other and to three Ethiopian viruses from 2007-8 (Fig. 38).

A second batch of 13 samples was received on 06/03/2009. FMDV type O was identified in three of these (ETH/34/2008, ETH/35/2008 & ETH/22/2009); however, none grew on cell culture. Sequencing results are pending. Of the remaining 10 samples FMDV genome was detected in five, while no virus could be detected in the other five.

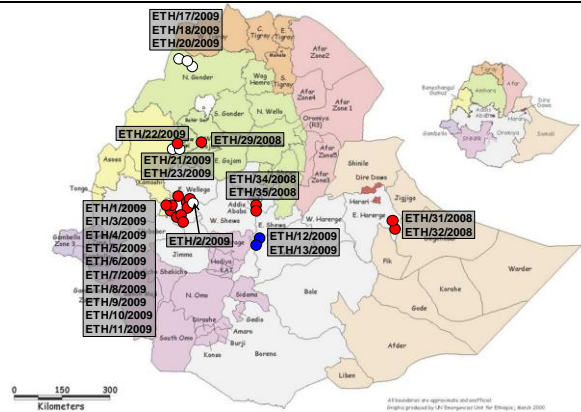


Fig. 36. FMDV types O (red) and A (blue) and FMDV-GD (white) in Ethiopia in 2008 and 2009.

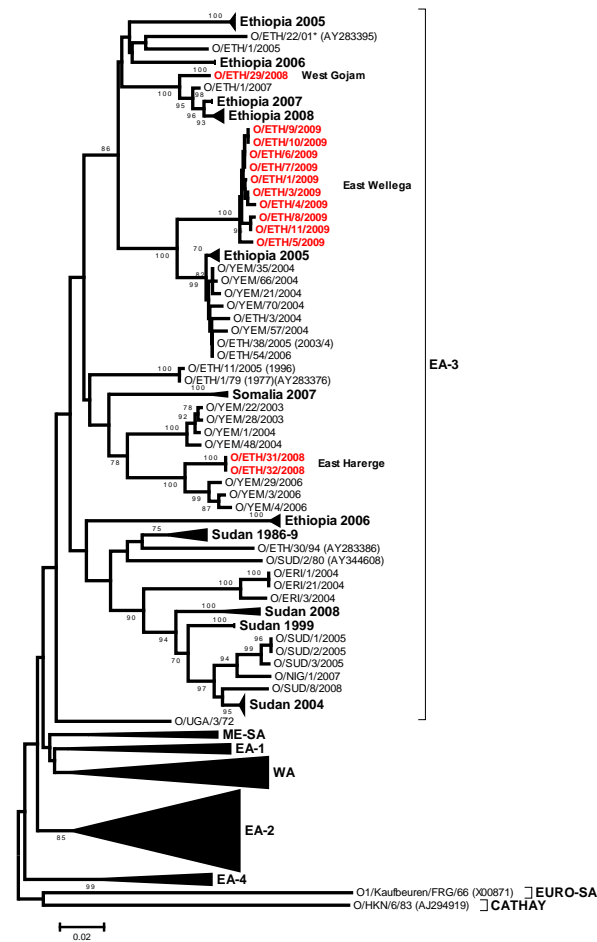


Fig. 37. Relationships between FMDV type O viruses from Ethiopia in 2008 and 2009.

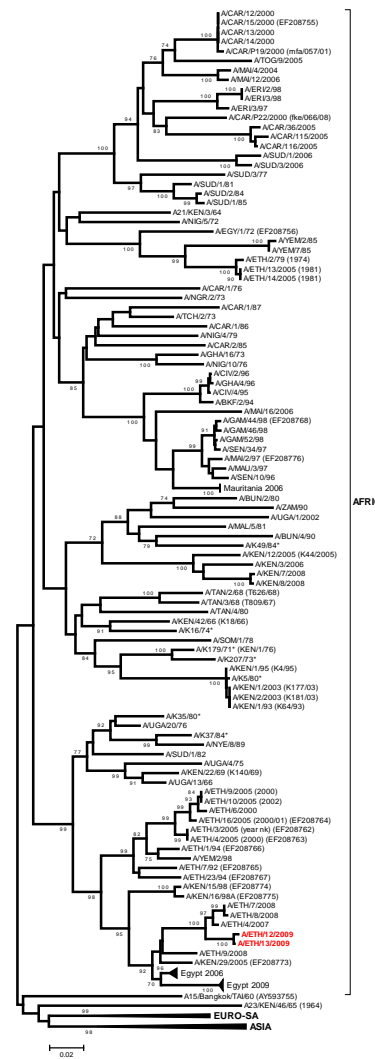


Fig. 38. Relationships between FMDV type A viruses from Ethiopia in 2009.

AFRICA - Southern

Zambia: Samples collected from cattle at three locations in Zambia were received by the WRLFMD on 30/03/2009. Nine samples were from Mbala district in the Northern province, two samples from Mungwi district, also in the Northern province and five samples from Kazungula district in the Southern province. FMDV type SAT 1 was identified in six of the Mbala samples, while SAT 2 was identified in four of the Kazungula samples. Three samples from Mbala and one from Mungwi were positive only by real-time RT-PCR (FMDV-GD) and therefore not typed (Fig.39). Phylogenetic analysis showed the SAT 1 viruses to belong to toptype I (NWZ) and were most closely related to viruses from Kenya and Tanzania (Fig. 40). The SAT 2 viruses belonged to toptype III were most closely related to viruses from Botswana (2006 & 2008), Namibia (2007-8) and Zambia (2008) (Fig. 41).



Fig. 39. FMDV SAT 1 (yellow), SAT 2 (purple) & GD (white) in Zambia.

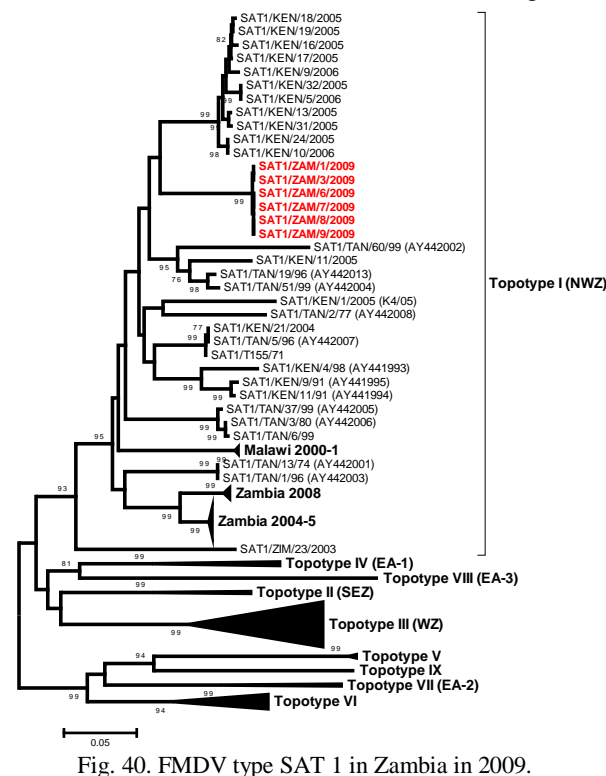


Fig. 40. FMDV type SAT 1 in Zambia in 2009.

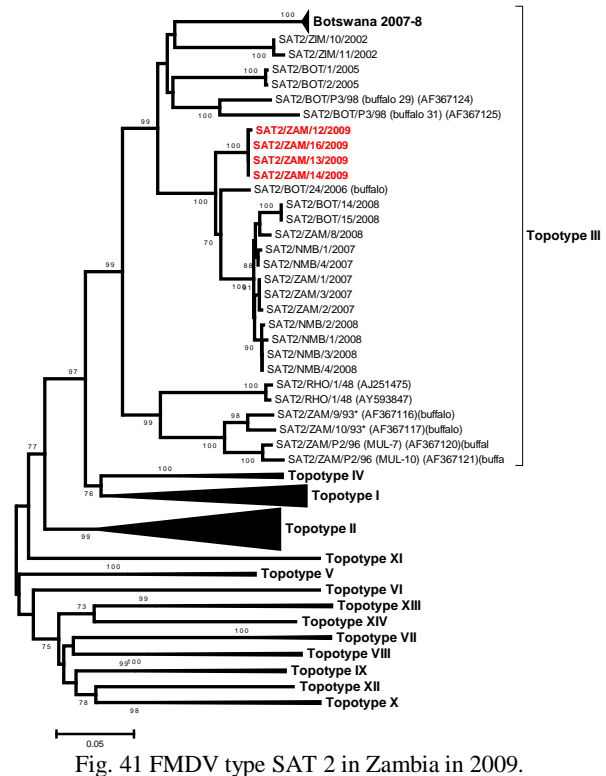


Fig. 41 FMDV type SAT 2 in Zambia in 2009.

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/2009.htm.

Results from samples received at WRL (status of samples being tested) are shown in Table 1 and a complete list of clinical sample diagnostics made by the WRL between January and March 2009 is shown in annex 1 Table A. A record of all samples received to IAH-Pirbright (January-March 2009) and their geographical locations are shown in annex 1 Table B and Figure 1.

Table 1: Status of sequencing of samples received by the WRLFMD from Jan-Mar 2009.

Batch	Country	Serotype	No. of isolates	Status
WRLFMD/2009/00001	Bahrain	A	2	Completed
WRLFMD/2009/00003	Iraq	A	7	Completed
WRLFMD/2009/00004	Kuwait	A	6	Completed
WRLFMD/2009/00005	United Arab Emirates	O	9	Completed
WRLFMD/2009/00006	Iraq	A	4	Completed
WRLFMD/2009/00007	Iran	A	27	Completed
WRLFMD/2009/00007	Iran	O	2	Completed
WRLFMD/2009/00008	Ethiopia	O	13	Completed
WRLFMD/2009/00008	Ethiopia	A	2	Completed
WRLFMD/2009/00009	Turkey	O	9	Completed
WRLFMD/2009/00009	Turkey	A	4	Completed
WRLFMD/2009/00010	Ethiopia	O	3	In progress
WRLFMD/2009/00011	Libya	A	37	Completed
WRLFMD/2009/00012	Egypt	A	9	Completed
WRLFMD/2009/00012	Egypt	O	10	Completed
WRLFMD/2009/00012	Egypt	A+O	2	In progress
WRLFMD/2009/00013	Lebanon	A	4	Completed
WRLFMD/2009/00014	Pakistan	O	1	Completed
WRLFMD/2009/00014	Pakistan	A	8	Completed
WRLFMD/2009/00014	Pakistan	Asia 1	2	In progress
WRLFMD/2009/00015	Yemen	O	14	In progress
WRLFMD/2009/00016	Zambia	SAT 1	6	Completed
WRLFMD/2009/00016	Zambia	SAT 2	4	Completed
Total			185	

Vaccine matching

Five FMDV type O isolates (O ETH 15 and 24/2008; and O SUD 3, 4 and 8/2008) from Ethiopia and Sudan collected in 2008 were further characterised by two dimensional virus neutralisation test (2dmVNT) and/or LPBE. The results showed that isolates O ETH 15 and 24/2008 and O SUD 4 and 8/2008 were antigenically close to all of O1 Manisa, O BFS 1860, O Ind R2/75 and O Kaufbeuren (not O ETH 24/2008) but did not match with O 4174 vaccine strains. Two isolates from Ethiopia and two isolates from Sudan were also matched with O 3039 and O Tunisia vaccine strains by LPBE, respectively. Isolate O SUD 3/2008 was only tested against O 4174 and the result showed no match between two viruses (Table C).

Twelve FMDV type A viruses (A BAR 2, 6 and 7/2008; A ETH 7 and 9/2008; A KUW 3 and 4/2008; A IRQ 9, 10, 17, 21 and 24/2009) from Bahrain, Ethiopia, Kuwait and Iraq collected in 2008 and 2009 were analysed for antigenic relationship with various vaccine strains by 2dmVNT and/or LPBE. All isolates tested showed close match to the A TUR 06 vaccine strain while failed to match with all of A IRN87, A IRN96, A SAU95 and A IND 17/82 vaccine strains. Isolates from Kuwait, Iraq and one (A BAR 2/2009) from Bahrain showed close match with A MAY97 by LPBE. Two isolates from Bahrain and one isolate from Ethiopia showed a match with A Ertrea98 vaccine strain by LPBE.

Three viruses from Bahrain, 1 from Kuwait and 3 from Iraq showed a match with the A₂₂ Iraq vaccine strain by either 2dmVNT or LPBE (Table C).

Two field isolates from Botswana (SAT2 BOT 16 and 18/2008) gave no antigenic match with SAT2 Eritrea98 vaccine strain by LPBE (Table C).

Annex 1.

Table A: Clinical sample diagnostics made by the WRL between January and March 2009

Country	WRL for FMD Sample Identification	Animal	Date of Collection	Results		
				VI/ELISA	RT-PCR	Final report
BAHRAIN	BAR 1/2009	Cattle	11.01.09	NVD	Positive	FMDV GD
	BAR 2/2009	Cattle	14.01.09	A	Positive	A
	BAR 3/2009	Cattle	14.01.09	NVD	Positive	FMDV GD
	BAR 4/2009	Cattle	14.01.09	A	Positive	A
EGYPT**	EGY 10/2006	Cattle	00.00.06	O	Positive	O
	EGY 11/2006	Cattle	00.00.06	O	Positive	O
	EGY 1/2008	Cattle	00.00.08	O	Positive	O
	EGY 2/2008	Cattle	03.09.08	NVD	Positive	FMDV GD
	EGY 3/2008	Cattle	03.09.08	O	Positive	O
	EGY 4/2008	Sheep	03.09.08	O	Positive	O
	EGY 5/2008	Sheep	03.09.08	O	Positive	O
	EGY 6/2008	Cattle	25.12.08	NVD	Positive	FMDV GD
	EGY 7/2008	Cattle	25.12.08	O	Positive	O
	EGY 1/2009	NK	00.00.09	O	Positive	O
	EGY 2/2009	Cattle	00.00.09	NVD	Negative	NVD
	EGY 3/2009	Cattle	00.00.09	A	Positive	A
	EGY 4/2009	Cattle	00.00.09	A	Positive	A
	EGY 5/2009	Cattle	22.01.09	NVD	Positive	FMDV GD
	EGY 6/2009	Cattle	22.01.09	O	Positive	O
	EGY 7/2009	Cattle	26.01.09	A	Positive	A
	EGY 8/2009	Cattle	26.01.09	OA	Positive	OA
	EGY 9/2009	Cattle	08.02.09	A	Positive	A
	EGY 10/2009	Cattle	08.02.09	OA	Positive	OA
	EGY 11/2009	NK	12.02.09	NVD	Negative	NVD
	EGY 12/2009	NK	12.02.09	A	Positive	A
	EGY 13/2009	NK	12.02.09	A	Positive	A
	EGY 14/2009	NK	12.02.09	A	Positive	A
	EGY 15/2009	NK	12.02.09	A	Positive	A
	EGY 16/2009	NK	12.02.09	A	Positive	A
ETHIOPIA	ETH 27/2008	Cattle	07.08.08	NVD	Negative	NVD
	ETH 28/2008	Cattle	07.08.08	NVD	Negative	NVD
	ETH 29/2008	Cattle	07.09.08	O	Positive	O
	ETH 30/2008	Cattle	17.12.08	NVD	Negative	NVD
	ETH 31/2008	Cattle	17.12.08	O	Positive	O
	ETH 32/2008	Cattle	17.12.08	O	Positive	O
	ETH 1/2009	Cattle	22.01.09	O	Positive	O
	ETH 2/2009	Cattle	22.01.09	NVD	Positive	FMDV GD
	ETH 3/2009	Cattle	22.01.09	O	Positive	O
	ETH 4/2009	Cattle	22.01.09	O	Positive	O
	ETH 5/2009	Cattle	22.01.09	O	Positive	O
	ETH 6/2009	Cattle	23.01.09	O	Positive	O
	ETH 7/2009	Cattle	23.01.09	O	Positive	O
	ETH 8/2009	Cattle	23.01.09	O	Positive	O
	ETH 9/2009	Cattle	23.01.09	O	Positive	O

	ETH 10/2009	Cattle	23.01.09	O	Positive	O
	ETH 11/2009	Cattle	23.01.09	O	Positive	O
	ETH 12/2009	Cattle	14.02.09	A	Positive	A
	ETH 13/2009	Cattle	14.02.09	A	Positive	A
	ETH 33/2008	Cattle	12.12.08	NVD	Negative	NVD
	ETH 34/2008	Cattle	17.12.08	O	Positive	O
	ETH 35/2008	Cattle	17.12.08	O	Positive	O
	ETH 14/2009	Cattle	05.01.09	NVD	Negative	NVD
	ETH 15/2009	Cattle	05.01.09	NVD	Negative	NVD
	ETH 16/2009	Cattle	10.01.09	NVD	Negative	NVD
	ETH 17/2009	Cattle	18.01.09	NVD	Positive	FMDV GD
	ETH 18/2009	Cattle	18.01.09	NVD	Positive	FMDV GD
	ETH 19/2009	Cattle	18.01.09	NVD	Negative	NVD
	ETH 20/2009	Cattle	18.01.09	NVD	Positive	FMDV GD
	ETH 21/2009	Cattle	11.02.09	NVD	Positive	FMDV GD
	ETH 22/2009	Cattle	11.02.09	O	Positive	O
	ETH 23/2009	Cattle	11.02.09	NVD	Positive	FMDV GD
IRAN	IRN 1/2009	NK	NK	A	Positive	A
	IRN 2/2009	NK	NK	A	Positive	A
	IRN 3/2009	NK	NK	A	Positive	A
	IRN 4/2009	NK	NK	A	Positive	A
	IRN 5/2009	NK	NK	A	Positive	A
	IRN 6/2009	NK	NK	A	Positive	A
	IRN 7/2009	NK	NK	O	Positive	O
	IRN 8/2009	NK	NK	A	Positive	A
	IRN 9/2009	NK	NK	A	Positive	A
	IRN 10/2009	NK	NK	A	Positive	A
	IRN 11/2009	NK	NK	A	Positive	A
	IRN 12/2009	NK	NK	A	Positive	A
	IRN 13/2009	NK	NK	A	Positive	A
	IRN 14/2009	NK	NK	O	Positive	O
	IRN 15/2009	NK	NK	A	Positive	A
	IRN 16/2009	NK	NK	A	Positive	A
	IRN 17/2009	NK	NK	A	Positive	A
	IRN 18/2009	NK	NK	A	Positive	A
	IRN 19/2009	NK	NK	A	Positive	A
	IRN 20/2009	NK	NK	A	Positive	A
	IRN 21/2009	NK	NK	A	Positive	A
	IRN 22/2009	NK	NK	A	Positive	A
	IRN 23/2009	NK	NK	A	Positive	A
	IRN 24/2009	NK	NK	A	Positive	A
	IRN 25/2009	NK	NK	A	Positive	A
	IRN 26/2009	NK	NK	A	Positive	A
	IRN 27/2009	NK	NK	A	Positive	A
	IRN 28/2009	NK	NK	A	Positive	A
	IRN 29/2009	NK	NK	A	Positive	A
IRAQ	IRQ 1/2009	Cattle	15.01.09	NVD	Negative	NVD
	IRQ 2/2009	Cattle	15.01.09	NVD	Negative	NVD
	IRQ 3/2009	Cattle	15.01.09	NVD	Negative	NVD
	IRQ 4/2009	Cattle	15.01.09	NVD	Negative	NVD
	IRQ 5/2009	Cattle	15.01.09	NVD	Negative	NVD
	IRQ 6/2009	Cattle	15.01.09	NVD	Negative	NVD
	IRQ 7/2009	Cattle	15.01.09	NVD	Positive	FMDV GD

	IRQ 8/2009	Cattle	15.01.09	NVD	Positive	FMDV GD
	IRQ 9/2009	Cattle	15.01.09	A	Positive	A
	IRQ 10/2009	Cattle	15.01.09	A	Negative	A
	IRQ 11/2009	Cattle	15.01.09	A	Positive	A
	IRQ 12/2009	Cattle	15.01.09	A	Positive	A
	IRQ 13/2009	Cattle	15.01.09	NVD	Negative	NVD
	IRQ 14/2009	Cattle	15.01.09	NVD	Negative	NVD
	IRQ 15/2009	Cattle	15.01.09	A	Positive	A
	IRQ 16/2009	Cattle	15.01.09	NVD	Negative	NVD
	IRQ 17/2009	Cattle	15.01.09	A	Positive	A
	IRQ 18/2009	Cattle	15.01.09	NVD	Positive	FMDV GD
	IRQ 19/2009	Cattle	15.01.09	A	Positive	A
	IRQ 20/2009	Cattle	15.01.09	NVD	Positive	FMDV GD
	IRQ 21/2009	Cattle	12.01.09	A	Positive	A
	IRQ 22/2009	Cattle	17.01.09	A	Positive	A
	IRQ 23/2009	Cattle	24.01.09	A	Positive	A
	IRQ 24/2009	Cattle	07.02.09	A	Positive	A
	IRQ 25/2009	Cattle	09.02.09	NVD	Positive	FMDV GD
ITALY***	ITL 7/2007	Pig	19.02.07	SVDV	Not tested	SVDV
	ITL 8/2007	Pig	19.02.07	SVDV	Not tested	SVDV
	ITL 9/2007	Pig	23.02.07	SVDV	Not tested	SVDV
	ITL 10/2007	Pig	26.02.07	SVDV	Not tested	SVDV
	ITL 11/2007	Pig	08.03.07	SVDV	Not tested	SVDV
	ITL 12/2007	Pig	14.03.07	SVDV	Not tested	SVDV
	ITL 13/2007	Pig	24.03.07	SVDV	Not tested	SVDV
	ITL 14/2007	Pig	18.04.07	SVDV	Not tested	SVDV
	ITL 15/2007	Pig	07.05.07	SVDV	Not tested	SVDV
	ITL 16/2007	Pig	29.05.07	SVDV	Not tested	SVDV
	ITL 17/2007	Pig	12.06.07	SVDV	Not tested	SVDV
	ITL 18/2007	Pig	26.06.07	SVDV	Not tested	SVDV
	ITL 19/2007	Pig	02.07.07	SVDV	Not tested	SVDV
	ITL 20/2007	Pig	04.07.07	SVDV	Not tested	SVDV
	ITL 21/2007	Pig	16.07.07	SVDV	Not tested	SVDV
	ITL 22/2007	Pig	23.07.07	SVDV	Not tested	SVDV
	ITL 23/2007	Pig	10.08.07	SVDV	Not tested	SVDV
	ITL 24/2007	Pig	28.08.07	SVDV	Not tested	SVDV
	ITL 25/2007	Pig	05.09.07	SVDV	Not tested	SVDV
	ITL 26/2007	Pig	17.09.07	SVDV	Not tested	SVDV
	ITL 27/2007	Pig	12.10.07	SVDV	Not tested	SVDV
	ITL 28/2007	Pig	12.10.07	SVDV	Not tested	SVDV
	ITL 29/2007	Pig	12.10.07	SVDV	Not tested	SVDV
	ITL 1/2008	Pig	20.03.08	SVDV	Not tested	SVDV
	ITL 2/2008	Pig	29.04.08	SVDV	Not tested	SVDV
	ITL 3/2008	Pig	26.05.08	SVDV	Not tested	SVDV
	ITL 4/2008	Pig	23.09.08	SVDV	Not tested	SVDV
	ITL 5/2008	Pig	02.10.08	SVDV	Not tested	SVDV
	ITL 6/2008	Pig	10.10.08	SVDV	Not tested	SVDV
	ITL 7/2008	Pig	08.11.08	SVDV	Not tested	SVDV
	ITL 8/2008	Pig	14.11.08	SVDV	Not tested	SVDV
	ITL 9/2008	Pig	29.11.08	SVDV	Not tested	SVDV
KUWAIT	KUW 1/2009	Cattle	NK	A	Positive	A
	KUW 2/2009	Cattle	NK	A	Positive	A
	KUW 3/2009	Cattle	NK	A	Positive	A

	KUW 4/2009	Cattle	NK	A	Positive	A
	KUW 5/2009	Cattle	NK	A	Positive	A
	KUW 6/2009	Cattle	NK	A	Positive	A
LEBANON	LEB 1/2009	Cattle	19.01.09	A	Positive	A
	LEB 2/2009	Cattle	19.01.09	NVD	Negative	NVD
	LEB 3/2009	Cattle	19.01.09	NVD	Positive	FMDV GD
	LEB 4/2009	Cattle	04.02.09	A	Positive	A
	LEB 5/2009	Cattle	04.02.09	A	Positive	A
	LEB 6/2009	Cattle	04.02.09	NVD	Positive	FMDV GD
	LEB 7/2009	Cattle	04.02.09	A	Negative	A
LIBYA	LIB 1-5/2009	Cattle	20.02.09	A	Positive	A
	LIB 6/2009	Cattle	20.02.09	A	Negative	A
	LIB 7/2009	Cattle	20.02.09	A	Positive	A
	LIB 8/2009	Cattle	20.02.09	A	Negative	A
	LIB 9-10/2009	Cattle	20.02.09	A	Positive	A
	LIB 11/2009	Cattle	20.02.09	A	Negative	A
	LIB 12-13/2009	Cattle	20.02.09	A	Positive	A
	LIB 14/2009	Cattle	20.02.09	A	Positive	A
	LIB 15/2009	Cattle	20.02.09	A	Positive	A
	LIB 16/2009	Cattle	20.02.09	A	Positive	A
	LIB 17/2009	Cattle	20.02.09	A	Positive	A
	LIB 18/2009	Cattle	20.02.09	A	Positive	A
	LIB 19/2009	Cattle	20.02.09	A	Positive	A
	LIB 20/2009	Cattle	20.02.09	A	Positive	A
	LIB 21/2009	Cattle	20.02.09	A	Positive	A
	LIB 22-31/2009	Buffalo	23.02.09	NVD	Negative	NVD
	LIB 32-34/2009	Buffalo	23.02.09	NVD	Negative	NVD
	LIB 35/2009	Buffalo	23.02.09	NVD	Negative	NVD
	LIB 36-37/2009	Cattle	23.02.09	NVD	Negative	NVD
	LIB 38-39/2009	Sheep	23.02.09	NVD	Negative	NVD
	LIB 40/2009	Cattle	23.02.09	NVD	Positive	FMDV GD
	LIB 41/2009	Cattle	23.02.09	NVD	Negative	NVD
	LIB 42-44/2009	Cattle	23.02.09	A	Positive	A
	LIB 45-46/2009	Cattle	23.02.09	NVD	Negative	NVD
	LIB 47-48/2009	Cattle	23.02.09	A	Positive	A
	LIB 49/2009	Cattle	23.02.09	NVD	Positive	FMDV GD
	LIB 50/209	Cattle	23.02.09	A	Not tested	A
	LIB 51/2009	Cattle	23.02.09	A	Not tested	A
	LIB 52/2009	Cattle	23.02.09	NVD	Positive	FMDV GD
	LIB 53/2009	Cattle	23.02.09	NVD	Positive	FMDV GD
	LIB 54/2009	Cattle	23.02.09	A	Positive	A
	LIB 55/2009	Cattle	23.02.09	A	Positive	A
	LIB 56/2009	Cattle	23.02.09	A	Positive	A
	LIB 57/2009	Cattle	23.02.09	A	Positive	A
	LIB 58-77/2009	Cattle	00.00.09	NVD	Negative	NVD
	LIB 78-79/2009	Cattle	00.00.09	NVD	Negative	NVD
	LIB 80/2009	Cattle	00.00.09	NVD	Positive	FMDV GD
	LIB 81-82/2009	Cattle	00.00.09	NVD	Negative	NVD
	LIB 83-88/2009	Cattle	00.00.09	NVD	Negative	NVD
	LIB 89-90/2009	Cattle	00.00.09	NVD	Negative	NVD
	LIB 91/2009	Cattle	00.00.09	A	Negative	A
	LIB 92/2009	Cattle	00.00.09	A	Negative	A
	LIB 93/2009	Cattle	00.00.09	A	Negative	A

	LIB 94/2009	Cattle	00.00.09	A	Positive	A
	LIB 95-115/2009	Cattle	00.00.09	NVD	Negative	NVD
	LIB 116/2009	Cattle	06.03.09	NVD	Negative	NVD
	LIB 117/2009	Cattle	06.03.09	A	Positive	A
PAKISTAN	PAK 7/2008	Buffalo	24.12.08	A	Positive	A
	PAK 8/2008	Buffalo	24.12.08	Asia 1	Positive	Asia 1
	PAK 9/2008	Buffalo	24.12.08	A	Positive	A
	PAK 10/2008	Buffalo	24.12.08	A	Positive	A
	PAK 11/2008	Buffalo	24.12.08	Asia 1	Positive	Asia 1
	PAK 12/2008	Buffalo	26.12.08	A	Positive	A
	PAK 13/2008	Buffalo	26.12.08	A	Positive	A
	PAK 14/2008	Buffalo	26.12.08	O	Positive	O
	PAK 1/2009	Cattle	13.02.09	A	Positive	A
	PAK 2/2009	Cattle	13.02.09	A	Positive	A
	PAK 3/2009	Cattle	12.03.09	NVD	Negative	NVD
	PAK 4/2009	Cattle	12.03.09	A	Positive	A
SENEGAL	SEN 9/2008	Pig	29.12.2008	NVD	Negative	NVD
	SEN 10/2//08	Pig	29.12.2008	NVD	Negative	NVD
	SEN 11/2008	Pig	29.12.2008	NVD	Negative	NVD
	SEN 12/2008	Pig	29.12.2008	NVD	Negative	NVD
	SEN 13/2008	Pig	29.12.2008	NVD	Negative	NVD
	SEN 14/2008	Pig	29.12.2008	NVD	Positive	FMDV GD
	SEN 15/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 16/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 17/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 18/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 19/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 20/2008	Cattle	30.12.2008	NVD	Positive	FMDV GD
	SEN 21/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 22/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 23/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 24/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 25/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 26/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 27/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 28/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 29/2008	Cattle	30.12.2008	NVD	Positive	FMDV GD
	SEN 30/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 31/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 32/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 33/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 34/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 35/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 36/2008	Cattle	30.12.2008	NVD	Negative	NVD
	SEN 37/2008	Cattle	30.12.2008	NVD	Negative	NVD
SUDAN	SUD 1/2008	Cattle	04.02.08	SAT 2	Positive	SAT 2
	SUD 2/2008	Cattle	04.02.08	SAT 2	Positive	SAT 2
	SUD 3/2008	Cattle	11.02.08	O	Positive	O
	SUD 4/2008	Cattle	11.02.08	O	Positive	O
	SUD 5/2008	Cattle	11.02.08	O	Positive	O
	SUD 6/2008	Cattle	11.02.08	O	Positive	O
	SUD 7/2008	Cattle	09.05.08	NVD	Negative	NVD

	SUD 8/2008	Cattle	09.05.08	O	Positive	O
TURKEY	TUR 34/2008	Cattle	00.10.08	O	Not tested	O
	TUR 35/2008	Cattle	00.10.08	O	Not tested	O
	TUR 36/2008	Cattle	00.11.08	O	Not tested	O
	TUR 37/2008	Cattle	00.11.08	A	Not tested	A
	TUR 38/2008	Cattle	00.12.08	O	Not tested	O
	TUR 39/2008	Cattle	00.12.08	A	Not tested	A
	TUR 40/2008	Cattle	00.12.08	A	Not tested	A
	TUR 1/2009	Cattle	00.01.09	NVD	Positive	FMDV GD
	TUR 2/2009	Cattle	00.01.09	O	Not tested	O
	TUR 3/2009	Cattle	00.01.09	O	Not tested	O
	TUR 4/2009	Cattle	00.01.09	O	Not tested	O
	TUR 5/2009	Cattle	00.01.09	O	Not tested	O
	TUR 6/2009	Cattle	00.01.09	O	Positive	O
	TUR 7/2009	Cattle	00.02.09	A	Positive	A
UNITED ARAB EMIRATES	UAE 1/2008	Gazelle	29.12.08	O	Positive	O
	UAE 2/2008	Gazelle	29.12.08	O	Positive	O
	UAE 3/2008	Gazelle	29.12.08	O	Positive	O
	UAE 4/2008	Gazelle	30.12.08	O	Positive	O
	UAE 5/2008	Gazelle	30.12.08	NVD	Positive	FMDV GD
	UAE 6/2008	Gazelle	31.12.08	NVD	Negative	NVD
	UAE 7/2008	Gazelle	31.12.08	NVD	Negative	NVD
	UAE 8/2008	Gazelle	31.12.08	NVD	Negative	NVD
	UAE 9/2008	Gazelle	31.12.08	NVD	Positive	FMDV GD
	UAE 10/2008	Gazelle	31.12.08	NVD	Positive	FMDV GD
	UAE 11/2008	Gazelle	31.12.08	NVD	Negative	NVD
	UAE 12/2008	Gazelle	31.12.08	NVD	Positive	FMDV GD
	UAE 13/2008	Gazelle	31.12.08	NVD	Negative	NVD
	UAE 1/2009	Gazelle	18.01.09	O	Positive	O
	UAE 2/2009	Gazelle	29.01.08	NVD	Positive	FMDV GD
	UAE 3/2009	Black Buck	29.01.08	O	Positive	O
	UAE 4/2009	Black Buck	29.01.08	O	Positive	O
	UAE 5/2009	Black Buck	29.01.08	O	Positive	O
	UAE 6/2009	Black Buck	29.01.08	NVD	Positive	FMDV GD
	UAE 7/2009	Black Gazelle	01.02.09	NVD	Negative	NVD
	UAE 8/2009	Black Buck	01.02.09	NVD	Positive	FMDV GD
	UAE 9/2009	Black Buck	01.02.09	O	Positive	O
YEMEN	YEM 1/2007	Cattle	11.05.07	NVD	Negative	NVD
	YEM 2/2007	Cattle	11.05.07	NVD	Negative	NVD
	YEM 3/2007	Cattle	11.05.07	NVD	Negative	NVD
	YEM 4/2007	Cattle	11.05.07	NVD	Negative	NVD
	YEM 5/2007	Cattle	11.05.07	NVD	Negative	NVD
	YEM 1/2008	Cattle	17.07.08	NVD	Negative	NVD
	YEM 2/2008	Cattle	17.07.08	NVD	Negative	NVD
	YEM 3/2008	Cattle	28.07.08	NVD	Positive	FMDV GD
	YEM 4/2008	Cattle	28.07.08	O	Positive	O
	YEM 5/2008	Cattle	28.07.08	O	Positive	O

YEM 6/2008	Cattle	28.07.08	O	Positive	O
YEM 7/2008	Cattle	28.07.08	O	Positive	O
YEM 8/2008	Cattle	30.07.08	O	Positive	O
YEM 9/2008	Cattle	30.07.08	NVD	Positive	FMDV GD
YEM 10/2008	Cattle	18.12.08	O	Positive	O
YEM 11/2008	Cattle	18.12.08	NVD	Positive	FMDV GD
YEM 12/2008	Cattle	18.12.08	NVD	Positive	FMDV GD
YEM 13/2008	Cattle	19.12.08	NVD	Positive	FMDV GD
YEM 1/2009	Sheep	03.01.09	NVD	Negative	NVD
YEM 2/2009	Sheep	03.01.09	NVD	Negative	NVD
YEM 3/2009	Cattle	03.01.09	NVD	Negative	NVD
YEM 4/2009	Sheep	11.01.09	NVD	Negative	NVD
YEM 5/2009	Sheep	12.01.09	O	Positive	O
YEM 6/2009	Sheep	12.01.09	O	Positive	O
YEM 7/2009	Sheep	12.01.09	O	Positive	O
YEM 8/2009	Sheep	12.01.09	O	Positive	O
YEM 9/2009	Cattle	12.01.09	O	Positive	O
YEM 10/2009	Cattle	12.01.09	NVD	Positive	FMDV GD
YEM 11/2009	Cattle	12.01.09	O	Positive	O
YEM 12/2009	Cattle	12.01.09	O	Positive	O
YEM 13/2009	Cattle	12.01.09	NVD	Positive	FMDV GD
YEM 14/2009	Cattle	12.01.09	NVD	Positive	FMDV GD
YEM 15/2009	Cattle	12.10.09	NVD	Positive	FMDV GD
YEM 16/2009	Sheep	13.01.09	O	Positive	O
YEM 17/2009	Sheep	13.01.09	O	Positive	O
YEM 18/2009	Sheep	13.01.09	O	Positive	O
YEM 19/2009	Sheep	13.01.09	O	Positive	O
YEM 20/2009	Sheep	13.01.09	O	Positive	O
YEM 21/2009	Sheep	13.01.09	O	Positive	O
YEM 22/2009	Sheep	13.01.09	O	Positive	O
YEM 23/2009	Cattle	13.01.09	O	Positive	O
YEM 24/2009	Cattle	13.01.09	O	Positive	O
YEM 25/2009	Cattle	13.01.09	NVD	Negative	NVD
YEM 26/2009	Cattle	14.01.09	NVD	Positive	FMDV GD
YEM 27/2009	Cattle	14.01.09	NVD	Negative	NVD
YEM 28/2009	Cattle	14.01.09	NVD	Negative	NVD
YEM 29/2009	Cattle	19.01.09	O	Positive	O
YEM 30/2009	Cattle	20.01.09	O	Positive	O
YEM 31/2009	Cattle	20.01.09	NVD	Positive	FMDV GD
YEM 32/2009	Cattle	20.01.09	NVD	Positive	FMDV GD
YEM 33/2009	Cattle	20.01.09	O	Positive	O
YEM 34/2009	Cattle	24.01.09	O	Positive	O
YEM 35/2009	Cattle	24.01.09	O	Positive	O
YEM 36/2009	Cattle	28.01.09	O	Positive	O
YEM 37/2009	Cattle	28.01.09	O	Positive	O
YEM 38/2009	Cattle	28.01.09	NVD	Positive	FMDV GD
YEM 39/2009	Cattle	28.01.09	NVD	Positive	FMDV GD
YEM 40/2009	Goat	01.02.09	NVD	Negative	NVD
YEM 41/2009	Cattle	02.02.09	O	Positive	O
YEM 42/2009	Cattle	02.02.09	O	Positive	O
YEM 43/2009	Cattle	03.02.09	O	Positive	O
YEM 44/2009	Cattle	03.02.09	O	Negative	O
YEM 45/2009	Cattle	03.02.09	O	Positive	O
YEM 46/2009	Cattle	03.02.09	O	Positive	O
YEM 47/2009	Cattle	04.02.09	NVD	Negative	NVD

	YEM 48/2009	Cattle	16.02.09	NVD	Negative	NVD
	YEM 49/2009	Cattle	16.02.09	NVD	Negative	NVD
	YEM 50/2009	Goat	18.02.09	O	Positive	O
	YEM 51/2009	Cattle	25.02.09	NVD	Negative	NVD
	YEM 52/2009	Cattle	25.02.09	NVD	Negative	NVD
	YEM 53/2009	Cattle	25.02.09	O	Positive	O
	YEM 54/2009	Cattle	25.02.09	NVD	Negative	NVD
	YEM 55/2009	Cattle	26.02.09	NVD	Positive	FMDV GD
	YEM 56/2009	Cattle	26.02.09	O	Positive	O
ZAMBIA	ZAM 1/2009	Cattle	00.00.09	SAT 1	Positive	SAT 1
	ZAM 2/2009	Cattle	00.00.09	NVD	Positive	FMDV GD
	ZAM 3/2009	Cattle	00.00.09	SAT 1	Positive	SAT 1
	ZAM 4/2009	Cattle	00.00.09	NVD	Positive	FMDV GD
	ZAM 5/2009	Cattle	00.00.09	NVD	Positive	FMDV GD
	ZAM 6/2009	Cattle	00.00.09	SAT 1	Positive	SAT 1
	ZAM 7/2009	Cattle	00.00.09	SAT 1	Positive	SAT 1
	ZAM 8/2009	Cattle	00.00.09	SAT 1	Positive	SAT 1
	ZAM 9/2009	Cattle	00.00.09	SAT 1	Positive	SAT 1
	ZAM 10/2009	Cattle	00.00.09	NVD	Positive	FMDV GD
	ZAM 11/2009	Cattle	00.00.09	NVD	Negative	NVD
	ZAM 12/2009	Cattle	00.00.09	SAT 2	Positive	SAT 2
	ZAM 13/2009	Cattle	00.00.09	SAT 2	Positive	SAT 2
	ZAM 14/2009	Cattle	00.00.09	SAT 2	Positive	SAT 2
	ZAM 15/2009	Cattle	00.00.09	NVD	Negative	NVD
	ZAM 16/2009	Cattle	00.00.09	SAT 2	Positive	SAT 2
Total	452					

* Institute for Animal Health, Pirbright Laboratory, Woking, Surrey GU24 0NF

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

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

** two samples from Egypt contained a mixture of type O and A FMDVs

*** samples from Italy submitted for SVDV characterisation

TABLE B: Summary of samples collected and received to IAH-Pirbright (January-March 2009)

Country	No. of samples	Virus isolation in cell culture/ELISA							RT-PCR for FMD (or SVD)				
		FMD virus serotypes							SVD virus	NVD	virus (where appropriate)		
		O	A	C	SAT	SAT	SAT	Asia			Positive	Negative	Not tested
					1	2	3	1					
BAHRAIN	4	-	2	-	-	-	-	-	-	2	4	-	-
EGYPT**	25	11	11	-	-	-	-	-	-	5	23	2	-
ETHIOPIA	32	16	2	-	-	-	-	-	-	14	24	8	-
IRAN	29	2	27	-	-	-	-	-	-	-	29	-	-
IRAQ	25	-	11	-	-	-	-	-	-	14	15	10	-
ITALY***	32	-	-	-	-	-	-	-	32	-	-	-	32
KUWAIT	6	-	6	-	-	-	-	-	-	-	6	-	-
LEBANON	7	-	4	-	-	-	-	-	-	3	5	2	-
LIBYA	117	-	37	-	-	-	-	-	-	80	34	81	2
PAKISTAN	12	1	8	-	-	-	-	2	-	1	11	1	-
SUDAN	8	5	-	-	-	2	-	-	-	1	7	1	-
SENEGAL	29	-	-	-	-	-	-	-	-	29	3	26	-
TURKEY	14	9	4	-	-	-	-	-	-	1	3	-	11
UNITED ARAB EMIRATES	22	9	-	-	-	-	-	-	-	13	16	6	-
YEMEN	74	38	-	-	-	-	-	-	-	36	52	22	-
ZAMBIA	16	-	-	-	6	4	-	-	-	6	14	2	-
TOTAL	452	91	112	-	6	6	-	2	32	205	246	161	45

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NVD no FMD, SVD or vesicular stomatitis virus detected

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

** two samples from Egypt contained a mixture of type O and A FMDVs

*** samples from Italy submitted for SVDV characterisation

Figure 1. Geographical locations of clinical sample diagnostics made by the WRL between January and March 2009

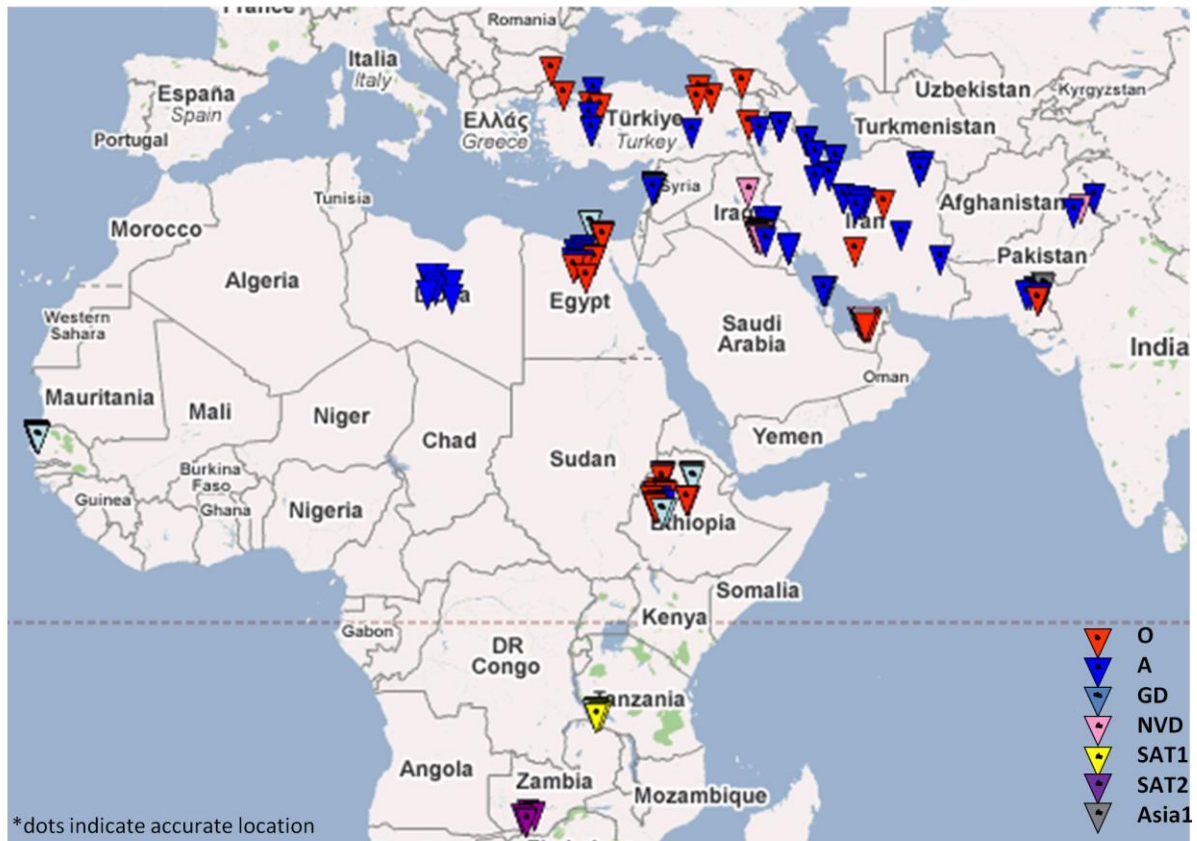


TABLE C: Antigenic characterisation of FMD field isolates by matching with vaccine strains by VNT and/or LPBE – r1 value data from 1st January to 31st March 2009

Field Isolate	"r1" values by 2dmVNT				"r1" values by LPBE					
	O Manisa	O BFS	O Ind R2/75	O Kauf	O Manisa	O 4174	O Tunisia 89	O 3039	O K77/78	O BFS
O ETH 15/2008	0.46	0.70	0.69	0.58		0.25		0.75		
O ETH 24/2008	0.44	0.70	0.65	0.23		0.25		1.00		
O Sud 3/2008						0.08				
O Sud 4/2008	0.68	0.49	0.78	0.36	0.47	0.17	≥0.75			
O Sud 8/2008	0.49	0.35	0.90	0.37	Fail	0.29	0.75			

Field isolates	"r1" values by 2dmVNT										"r1" values by LPBE				
	A Eri 3/98	A Tur06	A22 Irg	A22 Irg(5X)*	A Sau41/91	A Sau95	A Iln87	A Iln96	A Ind 17/82	A May97	A Eri 3/98	A22 Irg	A May97	A Iln87	A Sau95
A Bar 2/2009	0.04	>0.72	0.38	0.56	0.20				0.13			0.19	≥1	0.03	
A BAR 6/2008	0.04	0.60	0.23		0.40	0.11	0.12	0.06			0.57	1			0.19
A BAR 7/2008											0.32	0.59			0.17
A ETH 9/2008	0.12	0.46	0.07		0.04	0.3	0.04	0.07			0.1				0.25
A ETH 7/2008											0.31				
A Kuw 3/2009	≤0.04	>0.65	0.17	0.17	0.13				0.16			0.04	0.44	0.03	
A Kuw 4/2009	≤0.06	0.61	0.21	0.19	0.13				0.20			0.32	0.88	0.05	
A Irg 9/2009												0.29	0.42		
A Irg 10/2009		0.74	0.27		0.32		0.12	0.05		0.12					
A Irg 17/2009		>0.83	0.32		0.35		<0.13	0.05		0.13		0.33	0.83		
A Irg 21/2009		0.60	0.11	0.07	0.19							0.08	0.83	0.05	
A Irg 24/2009	≤0.04	0.81	0.53	0.50	0.24				0.22			0.50	≥1	0.15	

* sera from animals vaccinated with 5 times payload vaccine.

Field Isolate:	"r1" values by LPBE
	Sat2 Eritrea
Sat2 Bot 16/2008	0.11
Sat2 Bot 18/2008	0.06

Interpretation of r_1 values

In 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 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 3. Recent FMD Publications cited by PubMed

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Annex 4. RECOMMENDATIONS FROM THE WRL ON FMD VIRUS STRAINS TO BE INCLUDED IN FMDV ANTIGEN BANKS – March 2009

High Priority

O Manisa (*covers panasian topotype*)
O BFS or Campos
A24 Cruzeiro
Asia 1 Shamir
A22 Iraq (*or more suitable alternative for A Iran-05 strain*)
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)