

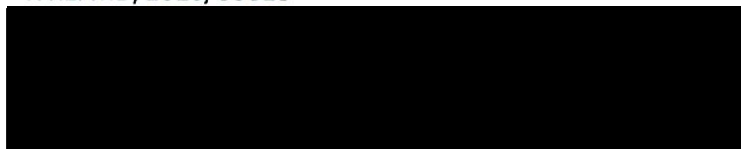


INSTITUTE FOR ANIMAL HEALTH
Director: Professor Martin W. Shirley, PhD
PIRBRIGHT LABORATORY
Ash Road,
Pirbright,
Surrey,
GU24 0NF
Intn Tel: 00 44 1483 232441
Tel: 01483 232441 Fax: 01483 232621

FMD Sequencing Report

Lab Reference WRL Batch Number: WRLFMD/2010/00015

Sender Details:



Date Received: 9th April 2010

Country of Origin: Pakistan

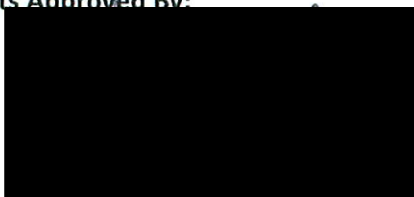
Date Reported: 17th May 2010

Dear Dr. Ehtisham Khan,

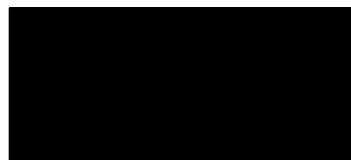
Sequencing work has now been completed in respect of the samples you submitted and the details are as attached. Please note that all of our phylogenetic trees can be accessed via the internet at:

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

Results Approved By:



Official Stamp:



Date:

18/5/10



To help us improve the quality of our service, please send any suggestions or requests to the Reference Laboratory by fax (+44 (0) 1483 232621 or email: elizabeth.wilson@bbsrc.ac.uk)

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

Genotyping Report

Date: 17 May 2010

FMDV type A

Country: Pakistan

Period: 2010

No. of isolates: 4

BATCH: WRLFMD/2010/00015



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FAO World Reference Laboratory for FMD Genotyping Report

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Serotype: A	Report date: 17/05/2010
WRLFMD Ref No: PAK/12/2010	Reported by: N.J. Knowles
Batch No: WRLFMD/2010/00015	Checked by: D.P. King
Sender Ref: PKB3	
Location: Khushab, Pakistan	Topotype: ASIA
Date collected: 26/02/2010	Genotype/strain: Iran-05 ^{AFG-07}
Date received by WRLFMD: 09/04/2010	Sequence filename: PAK10-12.SEQ
Date received for sequencing: 10/05/2010	Date sequence last updated: 17/05/2010
Species: Buffalo	No. of Nt determined: 639
Material used: BTy1	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 1272
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 300
	Total turn-around time: 38 days
	Sequencing time: 7 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/PAK/23/2010	PAK10-23	639	636	0	99.53	0.47	ASIA	Iran-05 ^{AFG-07}
2	A/PAK/13/2008	PAK08-13	639	634	0	99.22	0.78	ASIA	Iran-05 ^{AFG-07}
3	A/PAK/1/2009	PAK09-01	639	631	0	98.75	1.25	ASIA	Iran-05 ^{AFG-07}
4	A/PAK/2/2009	PAK09-02	639	631	0	98.75	1.25	ASIA	Iran-05 ^{AFG-07}
5	A/PAK/24/2009	PAK09-24	639	631	0	98.75	1.25	ASIA	Iran-05 ^{AFG-07}
6	A/PAK/31/2009	PAK09-31	639	631	0	98.75	1.25	ASIA	Iran-05 ^{AFG-07}
7	A/PAK/24/2010	PAK10-24	639	629	0	98.44	1.56	ASIA	Iran-05 ^{AFG-07}
8	A/IRN/9/2009	IRN09-09	639	621	0	97.18	2.82	ASIA	Iran-05 ^{AFG-07}
9	A/IRN/26/2009	IRN09-26	639	620	0	97.03	2.97	ASIA	Iran-05 ^{AFG-07}
10	A/AFG/44/2007	AFG07-44	639	619	0	96.87	3.13	ASIA	Iran-05 ^{AFG-07}
Most Closely Related Reference Viruses									
(see http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/AFG/6/2007	AFG07-06	639	618	0	96.71	3.29	ASIA	Iran-05 ^{AFG-07}
2	A/IRN/1/2005 (EF208769)	IRN05-01	639	608	0	95.15	4.85	ASIA	Iran-05
3	A/BAR/6/2008	BAR08-06	639	606	0	94.84	5.16	ASIA	Iran-05 ^{BAR-08}
4	A/TUR/1/2008	TUR08-01	639	600	0	93.90	6.10	ASIA	Iran-05 ^{ARD-07}
5	A/TUR/33/2008	TUR08-33	639	599	0	93.74	6.26	ASIA	Iran-05 ^{EZM-07}
6	A/IRN/2/87 (EF208770)	IRN87-02	636	541	0	85.06	14.94	ASIA	Iran-87
7	A/TAI/118/87* (EF208777)	TAI87-AD	636	536	0	84.28	15.72	ASIA	Thai-87
8	A/IRN/22/99 (EF208772)	IRN99-22	636	531	0	83.49	16.51	ASIA	Iran-99
9	A/TAI/2/97 (EF208778)	TAI97-02	636	529	0	83.18	16.82	ASIA	Thai-97
10	A22/IRQ/64 (AY593763)	IRQ64--A	639	530	0	82.94	17.06	ASIA	A ₂₂

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: A	Report date: 17/05/2010
WRLFMD Ref No: PAK/13/2010	Reported by: N.J. Knowles
Batch No: WRLFMD/2010/00015	Checked by: D.P. King
Sender Ref: PKB4	
Location: Khushab, Pakistan	Topotype: ASIA
Date collected: 26/02/2010	Genotype/strain: Iran-05 ^{BAR-08}
Date received by WRLFMD: 09/04/2010	Sequence filename: PAK10-13.SEQ
Date received for sequencing: 10/05/2010	Date sequence last updated: 17/05/2010
Species: Buffalo	No. of Nt determined: 639
Material used: BTy1	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 1272
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 300
	Total turn-around time: 38 days
	Sequencing time: 7 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/IRN/63/2009	IRN09-63	639	633	0	99.06	0.94	ASIA	Iran-05 ^{BAR-08}
2	A/BAR/6/2008	BAR08-06	639	630	0	98.59	1.41	ASIA	Iran-05 ^{BAR-08}
3	A/BAR/7/2008	BAR08-07	639	629	0	98.44	1.56	ASIA	Iran-05 ^{BAR-08}
4	A/IRN/5/2009	IRN09-05	639	628	0	98.28	1.72	ASIA	Iran-05 ^{BAR-08}
5	A/IRN/6/2009	IRN09-06	639	628	0	98.28	1.72	ASIA	Iran-05 ^{BAR-08}
6	A/IRN/13/2009	IRN09-13	639	627	0	98.12	1.88	ASIA	Iran-05 ^{BAR-08}
7	A/IRN/18/2009	IRN09-18	639	627	0	98.12	1.88	ASIA	Iran-05 ^{BAR-08}
8	A/IRN/19/2009	IRN09-19	639	627	0	98.12	1.88	ASIA	Iran-05 ^{BAR-08}
9	A/IRN/2/2009	IRN09-02	639	627	0	98.12	1.88	ASIA	Iran-05 ^{BAR-08}
10	A/IRN/21/2009	IRN09-21	639	627	0	98.12	1.88	ASIA	Iran-05 ^{BAR-08}
Most Closely Related Reference Viruses									
(see http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/BAR/6/2008	BAR08-06	639	630	0	98.59	1.41	ASIA	Iran-05 ^{BAR-08}
2	A/AFG/6/2007	AFG07-06	639	612	0	95.77	4.23	ASIA	Iran-05 ^{AFG-07}
3	A/IRN/1/2005 (EF208769)	IRN05-01	639	604	0	94.52	5.48	ASIA	Iran-05
4	A/TUR/1/2008	TUR08-01	639	600	0	93.90	6.10	ASIA	Iran-05 ^{ARD-07}
5	A/TUR/33/2008	TUR08-33	639	595	0	93.11	6.89	ASIA	Iran-05 ^{EZM-07}
6	A/TAI/118/87* (EF208777)	TAI87-AD	636	540	0	84.91	15.09	ASIA	Thai-87
7	A/IRN/2/87 (EF208770)	IRN87-02	636	533	0	83.81	16.19	ASIA	Iran-87
8	A/IRN/1/96 (EF208771)	IRN96-01	638	531	1	83.23	16.77	ASIA	Iran-96
9	A/IRN/22/99 (EF208772)	IRN99-22	636	529	0	83.18	16.82	ASIA	Iran-99
10	A/TAI/2/97 (EF208778)	TAI97-02	636	527	0	82.86	17.14	ASIA	Thai-97

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: A	Report date: 17/05/2010
WRLFMD Ref No: PAK/23/2010	Reported by: N.J. Knowles
Batch No: WRLFMD/2010/00015	Checked by: D.P. King
Sender Ref: PTX3	
Location: Taxilla, Pakistan	Topotype: ASIA
Date collected: 22/03/2010	Genotype/strain: Iran-05 ^{AFG-07}
Date received by WRLFMD: 09/04/2010	Sequence filename: PAK10-23.SEQ
Date received for sequencing: 10/05/2010	Date sequence last updated: 17/05/2010
Species: Buffalo	No. of Nt determined: 639
Material used: BTy2	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 1272
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 300
	Total turn-around time: 38 days
	Sequencing time: 7 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/PAK/12/2010	PAK10-12	639	636	0	99.53	0.47	ASIA	Iran-05 ^{AFG-07}
2	A/PAK/13/2008	PAK08-13	639	635	0	99.37	0.63	ASIA	Iran-05 ^{AFG-07}
3	A/PAK/1/2009	PAK09-01	639	632	0	98.90	1.10	ASIA	Iran-05 ^{AFG-07}
4	A/PAK/2/2009	PAK09-02	639	632	0	98.90	1.10	ASIA	Iran-05 ^{AFG-07}
5	A/PAK/24/2009	PAK09-24	639	632	0	98.90	1.10	ASIA	Iran-05 ^{AFG-07}
6	A/PAK/31/2009	PAK09-31	639	632	0	98.90	1.10	ASIA	Iran-05 ^{AFG-07}
7	A/PAK/24/2010	PAK10-24	639	630	0	98.59	1.41	ASIA	Iran-05 ^{AFG-07}
8	A/IRN/9/2009	IRN09-09	639	622	0	97.34	2.66	ASIA	Iran-05 ^{AFG-07}
9	A/IRN/26/2009	IRN09-26	639	621	0	97.18	2.82	ASIA	Iran-05 ^{AFG-07}
10	A/AFG/44/2007	AFG07-44	639	620	0	97.03	2.97	ASIA	Iran-05 ^{AFG-07}
Most Closely Related Reference Viruses									
(see http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/AFG/6/2007	AFG07-06	639	619	0	96.87	3.13	ASIA	Iran-05 ^{AFG-07}
2	A/IRN/1/2005 (EF208769)	IRN05-01	639	609	0	95.31	4.69	ASIA	Iran-05
3	A/BAR/6/2008	BAR08-06	639	607	0	94.99	5.01	ASIA	Iran-05 ^{BAR-08}
4	A/TUR/1/2008	TUR08-01	639	603	0	94.37	5.63	ASIA	Iran-05 ^{ARD-07}
5	A/TUR/33/2008	TUR08-33	639	598	0	93.58	6.42	ASIA	Iran-05 ^{EZM-07}
6	A/IRN/2/87 (EF208770)	IRN87-02	636	540	0	84.91	15.09	ASIA	Iran-87
7	A/TAI/118/87* (EF208777)	TAI87-AD	636	539	0	84.75	15.25	ASIA	Thai-87
8	A/TAI/2/97 (EF208778)	TAI97-02	636	532	0	83.65	16.35	ASIA	Thai-97
9	A22/IRQ/64 (AY593763)	IRQ64--A	639	533	0	83.41	16.59	ASIA	A ₂₂
10	A/IRN/22/99 (EF208772)	IRN99-22	636	530	0	83.33	16.67	ASIA	Iran-99

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: A	Report date: 17/05/2010
WRLFMD Ref No: PAK/24/2010	Reported by: N.J. Knowles
Batch No: WRLFMD/2010/00015	Checked by: D.P. King
Sender Ref: PTX4	
Location: Taxilla, Pakistan	Topotype: ASIA
Date collected: 22/03/2010	Genotype/strain: Iran-05 ^{AFG-07}
Date received by WRLFMD: 09/04/2010	Sequence filename: PAK10-24.SEQ
Date received for sequencing: 10/05/2010	Date sequence last updated: 17/05/2010
Species: Buffalo	No. of Nt determined: 639
Material used: BTy1	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 1272
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 300
	Total turn-around time: 38 days
	Sequencing time: 7 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/PAK/13/2008	PAK08-13	639	632	0	98.90	1.10	ASIA	Iran-05 ^{AFG-07}
2	A/PAK/23/2010	PAK10-23	639	630	0	98.59	1.41	ASIA	Iran-05 ^{AFG-07}
3	A/PAK/1/2009	PAK09-01	639	629	0	98.44	1.56	ASIA	Iran-05 ^{AFG-07}
4	A/PAK/12/2010	PAK10-12	639	629	0	98.44	1.56	ASIA	Iran-05 ^{AFG-07}
5	A/PAK/2/2009	PAK09-02	639	629	0	98.44	1.56	ASIA	Iran-05 ^{AFG-07}
6	A/PAK/24/2009	PAK09-24	639	629	0	98.44	1.56	ASIA	Iran-05 ^{AFG-07}
7	A/PAK/31/2009	PAK09-31	639	629	0	98.44	1.56	ASIA	Iran-05 ^{AFG-07}
8	A/IRN/9/2009	IRN09-09	639	621	0	97.18	2.82	ASIA	Iran-05 ^{AFG-07}
9	A/IRN/26/2009	IRN09-26	639	620	0	97.03	2.97	ASIA	Iran-05 ^{AFG-07}
10	A/AFG/44/2007	AFG07-44	639	619	0	96.87	3.13	ASIA	Iran-05 ^{AFG-07}
Most Closely Related Reference Viruses									
(see http://www.wrlfmd.org/fmd_genotyping/prototypes.htm)									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/AFG/6/2007	AFG07-06	639	618	0	96.71	3.29	ASIA	Iran-05 ^{AFG-07}
2	A/IRN/1/2005 (EF208769)	IRN05-01	639	608	0	95.15	4.85	ASIA	Iran-05
3	A/BAR/6/2008	BAR08-06	639	604	0	94.52	5.48	ASIA	Iran-05 ^{BAR-08}
4	A/TUR/1/2008	TUR08-01	639	599	0	93.74	6.26	ASIA	Iran-05 ^{ARD-07}
5	A/TUR/33/2008	TUR08-33	639	599	0	93.74	6.26	ASIA	Iran-05 ^{EZM-07}
6	A/TAI/118/87* (EF208777)	TAI87-AD	636	540	0	84.91	15.09	ASIA	Thai-87
7	A/IRN/2/87 (EF208770)	IRN87-02	636	537	0	84.43	15.57	ASIA	Iran-87
8	A/TAI/2/97 (EF208778)	TAI97-02	636	531	0	83.49	16.51	ASIA	Thai-97
9	A/IRN/22/99 (EF208772)	IRN99-22	636	530	0	83.33	16.67	ASIA	Iran-99
10	A22/IRQ/64 (AY593763)	IRQ64--A	639	532	0	83.26	16.74	ASIA	A ₂₂

nt, nucleotides

*, not a WRLFMD reference number

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Report on FMDV A in Pakistan in 2010

Batch: WRLFMD/2010/00015

Software: MEGA 4.0

No. of Taxa : 186

Data File : n:\evd\meg\db\fmv\la\PAK2010a.meg

Data Title : A Pakistan 2010

Data Type : Nucleotide (Coding)

Analysis : Phylogeny reconstruction

Tree Inference : =====

->Method : Neighbor-Joining

->Phylogeny Test and options : Bootstrap (1000 replicates; seed=64843)

Include Sites : =====

->Gaps/Missing Data : Pairwise Deletion

->Codon Positions : 1st+2nd+3rd+Noncoding

Substitution Model : =====

->Model : Nucleotide: Kimura 2-parameter

->Substitutions to Include : d: Transitions + Transversions

->Pattern among Lineages : Same (Homogeneous)

->Rates among sites : Uniform rates

No. of Sites : 639

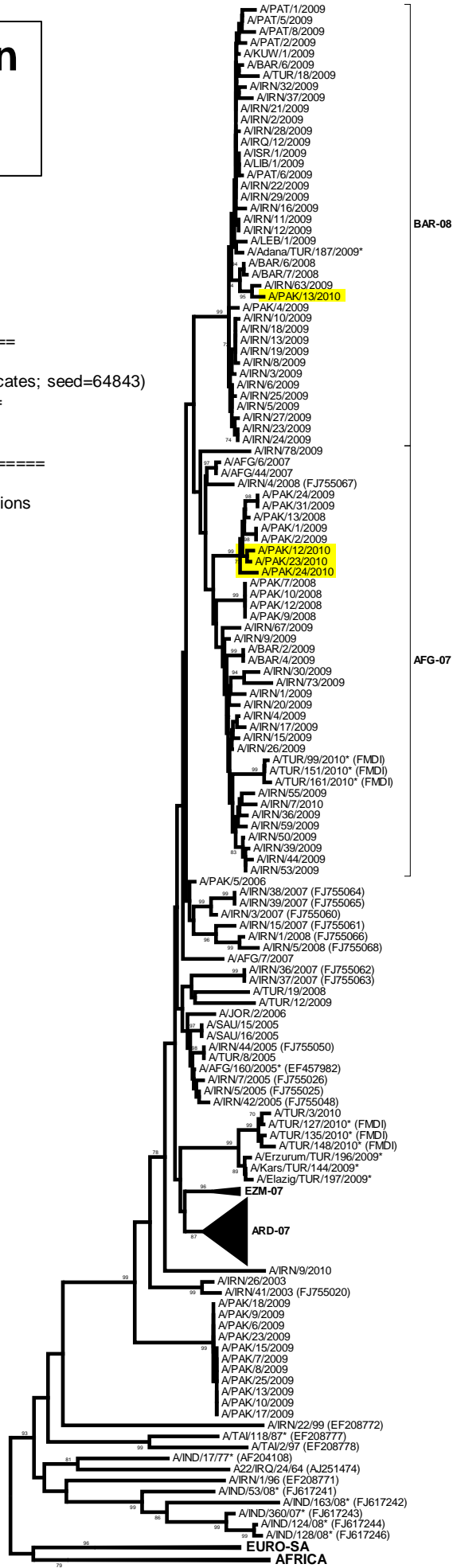
No Of Bootstrap Reps = 1000

Only bootstrap values of 70% and above are shown

*, not a WRLFMD Ref. No.

N.J. Knowles & J. Wadsworth, 17 May 2010

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0.02