

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

## Genotyping Report

Report Date for this Batch: 14 March 2016

FMDV type A

Country: Pakistan

Period: 2015

No. of samples: 9

BATCH: WRLFMD/2015/00037



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# FAO World Reference Laboratory for FMD Genotyping Report

IAH-P-EP-MEG-FOR-005-3

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Serotype: A	Report date: 11/03/2016
WRLFMD Ref No: PAK/25/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00037	Checked by: K. Bachanek-Bankowska
Sender Ref: PK28/12/15	
Location: Lahore, Lahore, Pakistan	Topotype: ASIA
Date collected: 05/06/2015	Genotype/strain: Iran-05 <sup>FAR-11</sup>
Date received by WRLFMD: 17/12/2015	Sequence filename: PAK15-25.SEQ
Date received for sequencing: 08/03/2016	Date sequence last updated: 10/03/2016
Species: Cattle	No. of Nt determined: 639
Material used: BTY2 23/02/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2122
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 85 days
	Sequencing time: 3 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/10/2015	PAK15-10	639	638	0	99.84	0.16	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/PAK/13/2015	PAK15-13	639	638	0	99.84	0.16	ASIA	Iran-05 <sup>FAR-11</sup>
3	A/PAK/15/2015	PAK15-15	639	638	0	99.84	0.16	ASIA	Iran-05 <sup>FAR-11</sup>
4	A/PAK/16/2015	PAK15-16	639	638	0	99.84	0.16	ASIA	Iran-05 <sup>FAR-11</sup>
5	A/PAK/17/2015	PAK15-17	639	635	0	99.37	0.63	ASIA	Iran-05 <sup>FAR-11</sup>
6	A/PAK/20/2015	PAK15-20	639	635	0	99.37	0.63	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/PAK/41/2014	PAK14-41	639	634	0	99.22	0.78	ASIA	Iran-05 <sup>FAR-11</sup>
8	A/PAK/43/2014	PAK14-43	639	634	0	99.22	0.78	ASIA	Iran-05 <sup>FAR-11</sup>
9	A/PAK/33/2014	PAK14-33	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
10	A/PAK/12/2015	PAK15-12	639	631	0	98.75	1.25	ASIA	Iran-05 <sup>FAR-11</sup>
Most Closely Related Reference Viruses									
(see <a href="http://www.wrlfmd.org/fmd_genotyping/prototypes.htm">http://www.wrlfmd.org/fmd_genotyping/prototypes.htm</a> )									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/IRN/1/2011	IRN11-01	639	614	0	96.09	3.91	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/AFG/6/2007 (FJ755007)	AFG07-06	639	603	0	94.37	5.63	ASIA	Iran-05 <sup>AFG-07</sup>
3	A/BAR/6/2008 (FJ755010)	BAR08-06	639	597	0	93.43	6.57	ASIA	Iran-05 <sup>BAR-08</sup>
4	A/AFG/10/2010	AFG10-10	639	596	0	93.27	6.73	ASIA	Iran-05 <sup>HER-10</sup>
5	A/IRN/15/2012	IRN12-15	639	596	0	93.27	6.73	ASIA	Iran-05 <sup>SIS-12</sup>
6	A/IRN/1/2005 (EF208769)	IRN05-01	639	595	0	93.11	6.89	ASIA	Iran-05
7	A/IRN/78/2009	IRN09-78	639	595	0	93.11	6.89	ASIA	Iran-05 <sup>FAR-09</sup>
8	A/IRN/125/2010	IRN10125	639	592	0	92.64	7.36	ASIA	Iran-05 <sup>SIS-10</sup>
9	A/TUR/1/2008 (FJ755133)	TUR08-01	639	591	0	92.49	7.51	ASIA	Iran-05 <sup>ARD-07</sup>
10	A/TUR/33/2008 (FJ755155)	TUR08-33	639	588	0	92.02	7.98	ASIA	Iran-05 <sup>EZM-07</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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# FAO World Reference Laboratory for FMD Genotyping Report

IAH-P-EP-MEG-FOR-005-3

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Serotype: A	Report date: 11/03/2016
WRLFMD Ref No: PAK/31/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00037	Checked by: K. Bachanek-Bankowska
Sender Ref: PK14/12/15	
Location: Karachi, Sindh, Pakistan	Topotype: ASIA
Date collected: 31/08/2015	Genotype/strain: Iran-05 <sup>FAR-11</sup>
Date received by WRLFMD: 17/12/2015	Sequence filename: PAK15-31.SEQ
Date received for sequencing: 08/03/2016	Date sequence last updated: 10/03/2016
Species: Water Buffalo	No. of Nt determined: 639
Material used: BTY1 18/02/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2122
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 85 days
	Sequencing time: 3 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/35/2015	PAK15-35	639	638	0	99.84	0.16	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/PAK/50/2015	PAK15-50	639	637	0	99.69	0.31	ASIA	Iran-05 <sup>FAR-11</sup>
3	A/PAK/55/2015	PAK15-55	639	637	0	99.69	0.31	ASIA	Iran-05 <sup>FAR-11</sup>
4	A/PAK/46/2015	PAK15-46	639	634	0	99.22	0.78	ASIA	Iran-05 <sup>FAR-11</sup>
5	A/PAK/56/2015	PAK15-56	639	634	0	99.22	0.78	ASIA	Iran-05 <sup>FAR-11</sup>
6	A/PAK/17/2015	PAK15-17	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/PAK/20/2015	PAK15-20	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
8	A/PAK/10/2015	PAK15-10	639	631	0	98.75	1.25	ASIA	Iran-05 <sup>FAR-11</sup>
9	A/PAK/13/2015	PAK15-13	639	631	0	98.75	1.25	ASIA	Iran-05 <sup>FAR-11</sup>
10	A/PAK/15/2015	PAK15-15	639	631	0	98.75	1.25	ASIA	Iran-05 <sup>FAR-11</sup>
Most Closely Related Reference Viruses									
(see <a href="http://www.wrlfmd.org/fmd_genotyping/prototypes.htm">http://www.wrlfmd.org/fmd_genotyping/prototypes.htm</a> )									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/IRN/1/2011	IRN11-01	639	611	0	95.62	4.38	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/AFG/6/2007 (FJ755007)	AFG07-06	639	600	0	93.90	6.10	ASIA	Iran-05 <sup>AFG-07</sup>
3	A/BAR/6/2008 (FJ755010)	BAR08-06	639	594	0	92.96	7.04	ASIA	Iran-05 <sup>BAR-08</sup>
4	A/AFG/10/2010	AFG10-10	639	593	0	92.80	7.20	ASIA	Iran-05 <sup>HER-10</sup>
5	A/IRN/15/2012	IRN12-15	639	593	0	92.80	7.20	ASIA	Iran-05 <sup>SIS-12</sup>
6	A/IRN/1/2005 (EF208769)	IRN05-01	639	592	0	92.64	7.36	ASIA	Iran-05
7	A/IRN/78/2009	IRN09-78	639	592	0	92.64	7.36	ASIA	Iran-05 <sup>FAR-09</sup>
8	A/IRN/125/2010	IRN10125	639	589	0	92.18	7.82	ASIA	Iran-05 <sup>SIS-10</sup>
9	A/TUR/1/2008 (FJ755133)	TUR08-01	639	588	0	92.02	7.98	ASIA	Iran-05 <sup>ARD-07</sup>
10	A/TUR/33/2008 (FJ755155)	TUR08-33	639	585	0	91.55	8.45	ASIA	Iran-05 <sup>EZM-07</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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# FAO World Reference Laboratory for FMD Genotyping Report

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Serotype: A	Report date: 11/03/2016
WRLFMD Ref No: PAK/35/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00037	Checked by: K. Bachanek-Bankowska
Sender Ref: PK23/12/15	
Location: Karachi, Sindh, Pakistan	Topotype: ASIA
Date collected: 16/09/2015	Genotype/strain: Iran-05 <sup>FAR-11</sup>
Date received by WRLFMD: 17/12/2015	Sequence filename: PAK15-35.SEQ
Date received for sequencing: 08/03/2016	Date sequence last updated: 10/03/2016
Species: Cattle	No. of Nt determined: 639
Material used: BTY1 23/02/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2122
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 85 days
	Sequencing time: 3 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/31/2015	PAK15-31	639	638	0	99.84	0.16	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/PAK/50/2015	PAK15-50	639	636	0	99.53	0.47	ASIA	Iran-05 <sup>FAR-11</sup>
3	A/PAK/55/2015	PAK15-55	639	636	0	99.53	0.47	ASIA	Iran-05 <sup>FAR-11</sup>
4	A/PAK/46/2015	PAK15-46	639	633	0	99.06	0.94	ASIA	Iran-05 <sup>FAR-11</sup>
5	A/PAK/56/2015	PAK15-56	639	633	0	99.06	0.94	ASIA	Iran-05 <sup>FAR-11</sup>
6	A/PAK/17/2015	PAK15-17	639	631	0	98.75	1.25	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/PAK/20/2015	PAK15-20	639	631	0	98.75	1.25	ASIA	Iran-05 <sup>FAR-11</sup>
8	A/PAK/10/2015	PAK15-10	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
9	A/PAK/13/2015	PAK15-13	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
10	A/PAK/15/2015	PAK15-15	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
Most Closely Related Reference Viruses									
(see <a href="http://www.wrlfmd.org/fmd_genotyping/prototypes.htm">http://www.wrlfmd.org/fmd_genotyping/prototypes.htm</a> )									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/IRN/1/2011	IRN11-01	639	610	0	95.46	4.54	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/AFG/6/2007 (FJ755007)	AFG07-06	639	599	0	93.74	6.26	ASIA	Iran-05 <sup>AFG-07</sup>
3	A/BAR/6/2008 (FJ755010)	BAR08-06	639	593	0	92.80	7.20	ASIA	Iran-05 <sup>BAR-08</sup>
4	A/IRN/78/2009	IRN09-78	639	593	0	92.80	7.20	ASIA	Iran-05 <sup>FAR-09</sup>
5	A/AFG/10/2010	AFG10-10	639	592	0	92.64	7.36	ASIA	Iran-05 <sup>HER-10</sup>
6	A/IRN/15/2012	IRN12-15	639	592	0	92.64	7.36	ASIA	Iran-05 <sup>SIS-12</sup>
7	A/IRN/1/2005 (EF208769)	IRN05-01	639	591	0	92.49	7.51	ASIA	Iran-05
8	A/IRN/125/2010	IRN10125	639	588	0	92.02	7.98	ASIA	Iran-05 <sup>SIS-10</sup>
9	A/TUR/1/2008 (FJ755133)	TUR08-01	639	587	0	91.86	8.14	ASIA	Iran-05 <sup>ARD-07</sup>
10	A/TUR/33/2008 (FJ755155)	TUR08-33	639	584	0	91.39	8.61	ASIA	Iran-05 <sup>EZM-07</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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# FAO World Reference Laboratory for FMD Genotyping Report

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Serotype: A	Report date: 11/03/2016
WRLFMD Ref No: PAK/36/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00037	Checked by: K. Bachanek-Bankowska
Sender Ref: PK16/12/15	
Location: Karachi, Sindh, Pakistan	Topotype: ASIA
Date collected: 19/09/2015	Genotype/strain: Iran-05 <sup>FAR-11</sup>
Date received by WRLFMD: 17/12/2015	Sequence filename: PAK15-36.SEQ
Date received for sequencing: 08/03/2016	Date sequence last updated: 10/03/2016
Species: Cattle	No. of Nt determined: 639
Material used: BTY1 23/02/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2122
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 85 days
	Sequencing time: 3 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/41/2014	PAK14-41	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/PAK/43/2014	PAK14-43	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
3	A/PAK/17/2015	PAK15-17	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
4	A/PAK/20/2015	PAK15-20	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
5	A/PAK/10/2015	PAK15-10	639	628	0	98.28	1.72	ASIA	Iran-05 <sup>FAR-11</sup>
6	A/PAK/13/2015	PAK15-13	639	628	0	98.28	1.72	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/PAK/15/2015	PAK15-15	639	628	0	98.28	1.72	ASIA	Iran-05 <sup>FAR-11</sup>
8	A/PAK/16/2015	PAK15-16	639	628	0	98.28	1.72	ASIA	Iran-05 <sup>FAR-11</sup>
9	A/PAK/33/2014	PAK14-33	639	628	0	98.28	1.72	ASIA	Iran-05 <sup>FAR-11</sup>
10	A/PAK/12/2015	PAK15-12	639	627	0	98.12	1.88	ASIA	Iran-05 <sup>FAR-11</sup>
Most Closely Related Reference Viruses									
(see <a href="http://www.wrlfmd.org/fmd_genotyping/prototypes.htm">http://www.wrlfmd.org/fmd_genotyping/prototypes.htm</a> )									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/IRN/1/2011	IRN11-01	639	616	0	96.40	3.60	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/AFG/6/2007 (FJ755007)	AFG07-06	639	603	0	94.37	5.63	ASIA	Iran-05 <sup>AFG-07</sup>
3	A/BAR/6/2008 (FJ755010)	BAR08-06	639	597	0	93.43	6.57	ASIA	Iran-05 <sup>BAR-08</sup>
4	A/IRN/78/2009	IRN09-78	639	597	0	93.43	6.57	ASIA	Iran-05 <sup>FAR-09</sup>
5	A/AFG/10/2010	AFG10-10	639	594	0	92.96	7.04	ASIA	Iran-05 <sup>HER-10</sup>
6	A/IRN/15/2012	IRN12-15	639	594	0	92.96	7.04	ASIA	Iran-05 <sup>SIS-12</sup>
7	A/IRN/1/2005 (EF208769)	IRN05-01	639	593	0	92.80	7.20	ASIA	Iran-05
8	A/TUR/1/2008 (FJ755133)	TUR08-01	639	593	0	92.80	7.20	ASIA	Iran-05 <sup>ARD-07</sup>
9	A/IRN/125/2010	IRN10125	639	592	0	92.64	7.36	ASIA	Iran-05 <sup>SIS-10</sup>
10	A/IRN/9/2010	IRN10-09	639	587	0	91.86	8.14	ASIA	Iran-05 <sup>ESF-10</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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Serotype: A	Report date: 11/03/2016
WRLFMD Ref No: PAK/46/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00037	Checked by: K. Bachanek-Bankowska
Sender Ref: PK6/12/15	
Location: Rawalpindi, Punjab, Pakistan	Topotype: ASIA
Date collected: 16/10/2015	Genotype/strain: Iran-05 <sup>FAR-11</sup>
Date received by WRLFMD: 17/12/2015	Sequence filename: PAK15-46.SEQ
Date received for sequencing: 08/03/2016	Date sequence last updated: 10/03/2016
Species: Water Buffalo	No. of Nt determined: 639
Material used: BTY1 24/02/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2122
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 85 days
	Sequencing time: 3 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/31/2015	PAK15-31	639	634	0	99.22	0.78	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/PAK/35/2015	PAK15-35	639	633	0	99.06	0.94	ASIA	Iran-05 <sup>FAR-11</sup>
3	A/PAK/50/2015	PAK15-50	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
4	A/PAK/55/2015	PAK15-55	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
5	A/PAK/41/2014	PAK14-41	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
6	A/PAK/43/2014	PAK14-43	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/PAK/17/2015	PAK15-17	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
8	A/PAK/20/2015	PAK15-20	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
9	A/PAK/56/2015	PAK15-56	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
10	A/PAK/10/2015	PAK15-10	639	628	0	98.28	1.72	ASIA	Iran-05 <sup>FAR-11</sup>
Most Closely Related Reference Viruses									
(see <a href="http://www.wrlfmd.org/fmd_genotyping/prototypes.htm">http://www.wrlfmd.org/fmd_genotyping/prototypes.htm</a> )									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
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2	A/AFG/6/2007 (FJ755007)	AFG07-06	639	597	0	93.43	6.57	ASIA	Iran-05 <sup>AFG-07</sup>
3	A/AFG/10/2010	AFG10-10	639	594	0	92.96	7.04	ASIA	Iran-05 <sup>HER-10</sup>
4	A/IRN/15/2012	IRN12-15	639	592	0	92.64	7.36	ASIA	Iran-05 <sup>SIS-12</sup>
5	A/BAR/6/2008 (FJ755010)	BAR08-06	639	591	0	92.49	7.51	ASIA	Iran-05 <sup>BAR-08</sup>
6	A/IRN/78/2009	IRN09-78	639	591	0	92.49	7.51	ASIA	Iran-05 <sup>FAR-09</sup>
7	A/IRN/1/2005 (EF208769)	IRN05-01	639	589	0	92.18	7.82	ASIA	Iran-05
8	A/IRN/125/2010	IRN10125	639	588	0	92.02	7.98	ASIA	Iran-05 <sup>SIS-10</sup>
9	A/TUR/1/2008 (FJ755133)	TUR08-01	639	585	0	91.55	8.45	ASIA	Iran-05 <sup>ARD-07</sup>
10	A/TUR/33/2008 (FJ755155)	TUR08-33	639	582	0	91.08	8.92	ASIA	Iran-05 <sup>EZM-07</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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Serotype: A	Report date: 11/03/2016
WRLFMD Ref No: PAK/50/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00037	Checked by: K. Bachanek-Bankowska
Sender Ref: PK8/12/15	
Location: Mirpur, AJK, Pakistan	Topotype: ASIA
Date collected: 21/10/2015	Genotype/strain: Iran-05 <sup>FAR-11</sup>
Date received by WRLFMD: 17/12/2015	Sequence filename: PAK15-50.SEQ
Date received for sequencing: 08/03/2016	Date sequence last updated: 10/03/2016
Species: Water Buffalo	No. of Nt determined: 639
Material used: BTY1 24/02/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2122
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 85 days
	Sequencing time: 3 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/55/2015	PAK15-55	639	639	0	100.00	0.00	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/PAK/31/2015	PAK15-31	639	637	0	99.69	0.31	ASIA	Iran-05 <sup>FAR-11</sup>
3	A/PAK/35/2015	PAK15-35	639	636	0	99.53	0.47	ASIA	Iran-05 <sup>FAR-11</sup>
4	A/PAK/46/2015	PAK15-46	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
5	A/PAK/56/2015	PAK15-56	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
6	A/PAK/17/2015	PAK15-17	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/PAK/20/2015	PAK15-20	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
8	A/PAK/10/2015	PAK15-10	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
9	A/PAK/13/2015	PAK15-13	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
10	A/PAK/15/2015	PAK15-15	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
Most Closely Related Reference Viruses									
(see <a href="http://www.wrlfmd.org/fmd_genotyping/prototypes.htm">http://www.wrlfmd.org/fmd_genotyping/prototypes.htm</a> )									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/IRN/1/2011	IRN11-01	639	609	0	95.31	4.69	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/AFG/6/2007 (FJ755007)	AFG07-06	639	598	0	93.58	6.42	ASIA	Iran-05 <sup>AFG-07</sup>
3	A/BAR/6/2008 (FJ755010)	BAR08-06	639	592	0	92.64	7.36	ASIA	Iran-05 <sup>BAR-08</sup>
4	A/AFG/10/2010	AFG10-10	639	591	0	92.49	7.51	ASIA	Iran-05 <sup>HER-10</sup>
5	A/IRN/15/2012	IRN12-15	639	591	0	92.49	7.51	ASIA	Iran-05 <sup>SIS-12</sup>
6	A/IRN/1/2005 (EF208769)	IRN05-01	639	590	0	92.33	7.67	ASIA	Iran-05
7	A/IRN/78/2009	IRN09-78	639	590	0	92.33	7.67	ASIA	Iran-05 <sup>FAR-09</sup>
8	A/IRN/125/2010	IRN10125	639	589	0	92.18	7.82	ASIA	Iran-05 <sup>SIS-10</sup>
9	A/TUR/1/2008 (FJ755133)	TUR08-01	639	588	0	92.02	7.98	ASIA	Iran-05 <sup>ARD-07</sup>
10	A/TUR/33/2008 (FJ755155)	TUR08-33	639	583	0	91.24	8.76	ASIA	Iran-05 <sup>EZM-07</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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# FAO World Reference Laboratory for FMD Genotyping Report

IAH-P-EP-MEG-FOR-005-3

Page 1 of 1

Serotype: A	Report date: 11/03/2016
WRLFMD Ref No: PAK/53/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00037	Checked by: K. Bachanek-Bankowska
Sender Ref: PK4/12/15	
Location: Okara, Punjab, Pakistan	Topotype: ASIA
Date collected: 03/11/2015	Genotype/strain: Iran-05 <sup>FAR-09</sup>
Date received by WRLFMD: 17/12/2015	Sequence filename: PAK15-53.SEQ
Date received for sequencing: 08/03/2016	Date sequence last updated: 10/03/2016
Species: Cattle	No. of Nt determined: 639
Material used: BTY1 25/02/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2122
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 85 days
	Sequencing time: 3 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/27/2013	IRN13-27	639	624	0	97.65	2.35	ASIA	Iran-05 <sup>FAR-09</sup>
2	A/IRN/28/2013	IRN13-28	639	624	0	97.65	2.35	ASIA	Iran-05 <sup>FAR-09</sup>
3	A/PAK/10/2014	PAK14-10	639	623	0	97.50	2.50	ASIA	Iran-05 <sup>FAR-09</sup>
4	A/PAK/14/2014 (B)	PAK14B14	639	623	0	97.50	2.50	ASIA	Iran-05 <sup>FAR-09</sup>
5	A/PAK/8/2014	PAK14-08	639	622	0	97.34	2.66	ASIA	Iran-05 <sup>FAR-09</sup>
6	A/PAK/42/2014	PAK14-42	639	619	0	96.87	3.13	ASIA	Iran-05 <sup>FAR-09</sup>
7	A/PAK/38/2014	PAK14-38	639	618	0	96.71	3.29	ASIA	Iran-05 <sup>FAR-09</sup>
8	A/PAK/32/2014	PAK14-32	639	617	0	96.56	3.44	ASIA	Iran-05 <sup>FAR-09</sup>
9	A/PAK/7/2015	PAK15-07	639	617	0	96.56	3.44	ASIA	Iran-05 <sup>FAR-09</sup>
10	A/PAK/9/2015	PAK15-09	639	617	0	96.56	3.44	ASIA	Iran-05 <sup>FAR-09</sup>
Most Closely Related Reference Viruses									
(see <a href="http://www.wrlfmd.org/fmd_genotyping/prototypes.htm">http://www.wrlfmd.org/fmd_genotyping/prototypes.htm</a> )									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/IRN/78/2009	IRN09-78	639	598	0	93.58	6.42	ASIA	Iran-05 <sup>FAR-09</sup>
2	A/AFG/10/2010	AFG10-10	639	594	0	92.96	7.04	ASIA	Iran-05 <sup>HER-10</sup>
3	A/AFG/6/2007 (FJ755007)	AFG07-06	639	593	0	92.80	7.20	ASIA	Iran-05 <sup>AFG-07</sup>
4	A/IRN/1/2011	IRN11-01	639	593	0	92.80	7.20	ASIA	Iran-05 <sup>FAR-11</sup>
5	A/BAR/6/2008 (FJ755010)	BAR08-06	639	591	0	92.49	7.51	ASIA	Iran-05 <sup>BAR-08</sup>
6	A/IRN/1/2005 (EF208769)	IRN05-01	639	586	0	91.71	8.29	ASIA	Iran-05
7	A/TUR/1/2008 (FJ755133)	TUR08-01	639	585	0	91.55	8.45	ASIA	Iran-05 <sup>ARD-07</sup>
8	A/IRN/15/2012	IRN12-15	639	583	0	91.24	8.76	ASIA	Iran-05 <sup>SIS-12</sup>
9	A/IRN/125/2010	IRN10125	639	581	0	90.92	9.08	ASIA	Iran-05 <sup>SIS-10</sup>
10	A/TUR/33/2008 (FJ755155)	TUR08-33	639	579	0	90.61	9.39	ASIA	Iran-05 <sup>EZM-07</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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# FAO World Reference Laboratory for FMD Genotyping Report

IAH-P-EP-MEG-FOR-005-3

Page 1 of 1

Serotype: A	Report date: 11/03/2016
WRLFMD Ref No: PAK/55/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00037	Checked by: K. Bachanek-Bankowska
Sender Ref: PK10/12/15	
Location: Mirpur, AJK, Pakistan	Topotype: ASIA
Date collected: 12/11/2015	Genotype/strain: Iran-05 <sup>FAR-11</sup>
Date received by WRLFMD: 17/12/2015	Sequence filename: PAK15-55.SEQ
Date received for sequencing: 08/03/2016	Date sequence last updated: 10/03/2016
Species: Cattle	No. of Nt determined: 639
Material used: BTY1 25/02/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2122
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 85 days
	Sequencing time: 3 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/50/2015	PAK15-50	639	639	0	100.00	0.00	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/PAK/31/2015	PAK15-31	639	637	0	99.69	0.31	ASIA	Iran-05 <sup>FAR-11</sup>
3	A/PAK/35/2015	PAK15-35	639	636	0	99.53	0.47	ASIA	Iran-05 <sup>FAR-11</sup>
4	A/PAK/46/2015	PAK15-46	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
5	A/PAK/56/2015	PAK15-56	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
6	A/PAK/17/2015	PAK15-17	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/PAK/20/2015	PAK15-20	639	630	0	98.59	1.41	ASIA	Iran-05 <sup>FAR-11</sup>
8	A/PAK/10/2015	PAK15-10	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
9	A/PAK/13/2015	PAK15-13	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
10	A/PAK/15/2015	PAK15-15	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
Most Closely Related Reference Viruses									
(see <a href="http://www.wrlfmd.org/fmd_genotyping/prototypes.htm">http://www.wrlfmd.org/fmd_genotyping/prototypes.htm</a> )									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/IRN/1/2011	IRN11-01	639	609	0	95.31	4.69	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/AFG/6/2007 (FJ755007)	AFG07-06	639	598	0	93.58	6.42	ASIA	Iran-05 <sup>AFG-07</sup>
3	A/BAR/6/2008 (FJ755010)	BAR08-06	639	592	0	92.64	7.36	ASIA	Iran-05 <sup>BAR-08</sup>
4	A/AFG/10/2010	AFG10-10	639	591	0	92.49	7.51	ASIA	Iran-05 <sup>HER-10</sup>
5	A/IRN/15/2012	IRN12-15	639	591	0	92.49	7.51	ASIA	Iran-05 <sup>SIS-12</sup>
6	A/IRN/1/2005 (EF208769)	IRN05-01	639	590	0	92.33	7.67	ASIA	Iran-05
7	A/IRN/78/2009	IRN09-78	639	590	0	92.33	7.67	ASIA	Iran-05 <sup>FAR-09</sup>
8	A/IRN/125/2010	IRN10125	639	589	0	92.18	7.82	ASIA	Iran-05 <sup>SIS-10</sup>
9	A/TUR/1/2008 (FJ755133)	TUR08-01	639	588	0	92.02	7.98	ASIA	Iran-05 <sup>ARD-07</sup>
10	A/TUR/33/2008 (FJ755155)	TUR08-33	639	583	0	91.24	8.76	ASIA	Iran-05 <sup>EZM-07</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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# FAO World Reference Laboratory for FMD Genotyping Report

IAH-P-EP-MEG-FOR-005-3

Page 1 of 1

Serotype: A	Report date: 11/03/2016
WRLFMD Ref No: PAK/56/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00037	Checked by: K. Bachanek-Bankowska
Sender Ref: PK35/12/15	
Location: Okara, Lahore, Pakistan	Topotype: ASIA
Date collected: 04/11/2015	Genotype/strain: Iran-05 <sup>FAR-11</sup>
Date received by WRLFMD: 17/12/2015	Sequence filename: PAK15-56.SEQ
Date received for sequencing: 08/03/2016	Date sequence last updated: 10/03/2016
Species: Cattle	No. of Nt determined: 639
Material used: BTY1 23/02/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2122
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 85 days
	Sequencing time: 3 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/31/2015	PAK15-31	639	634	0	99.22	0.78	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/PAK/35/2015	PAK15-35	639	633	0	99.06	0.94	ASIA	Iran-05 <sup>FAR-11</sup>
3	A/PAK/50/2015	PAK15-50	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
4	A/PAK/55/2015	PAK15-55	639	632	0	98.90	1.10	ASIA	Iran-05 <sup>FAR-11</sup>
5	A/PAK/46/2015	PAK15-46	639	629	0	98.44	1.56	ASIA	Iran-05 <sup>FAR-11</sup>
6	A/PAK/17/2015	PAK15-17	639	627	0	98.12	1.88	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/PAK/20/2015	PAK15-20	639	627	0	98.12	1.88	ASIA	Iran-05 <sup>FAR-11</sup>
8	A/PAK/10/2015	PAK15-10	639	626	0	97.97	2.03	ASIA	Iran-05 <sup>FAR-11</sup>
9	A/PAK/13/2015	PAK15-13	639	626	0	97.97	2.03	ASIA	Iran-05 <sup>FAR-11</sup>
10	A/PAK/15/2015	PAK15-15	639	626	0	97.97	2.03	ASIA	Iran-05 <sup>FAR-11</sup>
Most Closely Related Reference Viruses									
(see <a href="http://www.wrlfmd.org/fmd_genotyping/prototypes.htm">http://www.wrlfmd.org/fmd_genotyping/prototypes.htm</a> )									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/IRN/1/2011	IRN11-01	639	607	0	94.99	5.01	ASIA	Iran-05 <sup>FAR-11</sup>
2	A/AFG/6/2007 (FJ755007)	AFG07-06	639	595	0	93.11	6.89	ASIA	Iran-05 <sup>AFG-07</sup>
3	A/BAR/6/2008 (FJ755010)	BAR08-06	639	589	0	92.18	7.82	ASIA	Iran-05 <sup>BAR-08</sup>
4	A/IRN/15/2012	IRN12-15	639	589	0	92.18	7.82	ASIA	Iran-05 <sup>SIS-12</sup>
5	A/AFG/10/2010	AFG10-10	639	588	0	92.02	7.98	ASIA	Iran-05 <sup>HER-10</sup>
6	A/IRN/1/2005 (EF208769)	IRN05-01	639	587	0	91.86	8.14	ASIA	Iran-05
7	A/IRN/78/2009	IRN09-78	639	587	0	91.86	8.14	ASIA	Iran-05 <sup>FAR-09</sup>
8	A/IRN/125/2010	IRN10125	639	584	0	91.39	8.61	ASIA	Iran-05 <sup>SIS-10</sup>
9	A/TUR/1/2008 (FJ755133)	TUR08-01	639	584	0	91.39	8.61	ASIA	Iran-05 <sup>ARD-07</sup>
10	A/TUR/33/2008 (FJ755155)	TUR08-33	639	580	0	90.77	9.23	ASIA	Iran-05 <sup>EZM-07</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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# Report on FMDV A in Pakistan in 2015

Batch: WRLFMD/2015/00037

◆ indicates viruses in this batch

Software: MEGA 6.06

Analysis

Analysis ----- Phylogeny Reconstruction

Scope ----- All Selected Taxa

Statistical Method ----- Neighbor-joining

Phylogeny Test

Test of Phylogeny ----- Bootstrap method

No. of Bootstrap Replications ----- 1000

Substitution Model

Substitutions Type ----- Nucleotide

Model/Method ----- Kimura 2-parameter model

Substitutions to Include ----- d: Transitions + Transversions

Rates and Patterns

Rates among Sites ----- Uniform rates

Pattern among Lineages ----- Same (Homogeneous)

Data Subset to Use

Gaps/Missing Data Treatment ----- Pairwise deletion

Codons Included ----- 1st+2nd+3rd+Non-Coding

No. of Sites : 639

No Of Bootstrap Reps = 1000

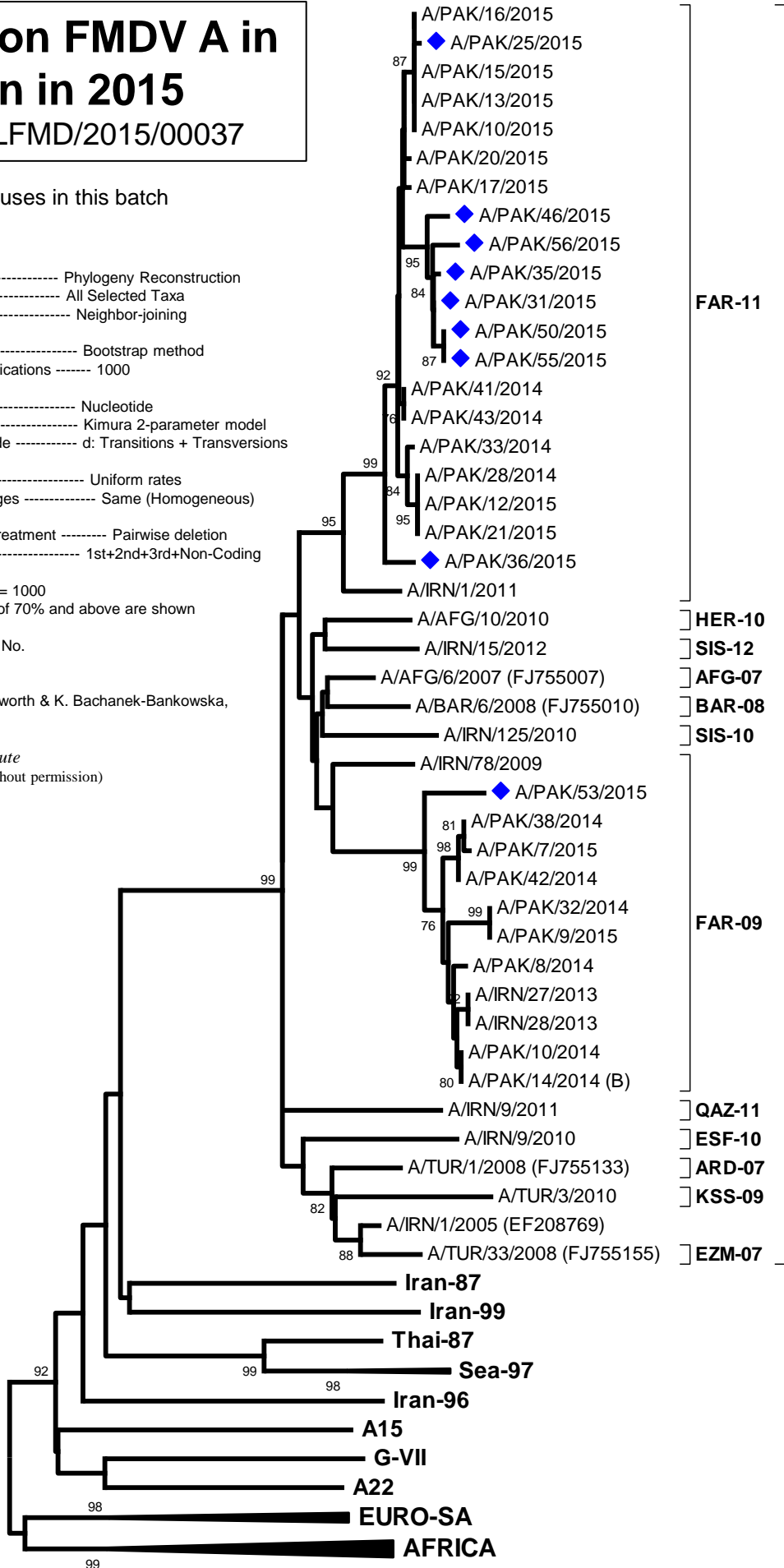
Only bootstrap values of 70% and above are shown

\*, not a WRLFMD Ref. No.

N.J. Knowles, J. Wadsworth & K. Bachanek-Bankowska,  
14 March 2016

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FAR-11

HER-10  
SIS-12  
AFG-07  
BAR-08  
SIS-10

Iran-05

ASIA

FAR-09

QAZ-11  
ESF-10  
ARD-07  
KSS-09  
EZM-07