

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

Genotyping Report

Report Date for this Batch: 9 December 2013

FMDV type O

Country: Pakistan

Period: 2012-2013

No. of samples: 11

BATCH: WRLFMD/2013/00024



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FAO World Reference Laboratory for FMD Genotyping Report

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Serotype: O WRLFMD Ref No: PAK/51/2012 Batch No: WRLFMD/2013/00024 Sender Ref: FMD-618 Location: Rahim Yar Khan district, Punjab province, Pakistan Date collected: 10/12/2012 Date received by WRLFMD: 07/11/2013 Date received for sequencing: 03/12/2013 Species: Cattle Material used: BTy1 13/11/2013 Region sequenced: VP1 RT-PCR primers: O-1C244F/EUR-2B52R O-1C272F/EUR-2B52R	Report date: 09/12/2013 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ME-SA Genotype/strain: unnamed Sequence filename: PAK12-51.SEQ Date sequence last updated: 05/12/2013 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 3721 Min. no. of nt for comparison: 600 Total turn-around time: 32 days Sequencing time: 6 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/PAK/40/2012	PAK12-40	639	637	0	99.69	0.31	ME-SA	unnamed
2	O/PAK/41/2012	PAK12-41	639	637	0	99.69	0.31	ME-SA	unnamed
3	O/PAK/53/2012	PAK12-53	639	634	0	99.22	0.78	ME-SA	unnamed
4	O/PAK/22/2013	PAK13-22	639	633	0	99.06	0.94	ME-SA	unnamed
5	O/PAK/55/2012	PAK12-55	639	633	0	99.06	0.94	ME-SA	unnamed
6	O/PAK/31/2007	PAK07-31	639	608	0	95.15	4.85	ME-SA	PanAsia-2
7	O/IRN/11/2006	IRN06-11	639	607	0	94.99	5.01	ME-SA	PanAsia-2
8	O/IRN/29/2006	IRN06-29	639	607	0	94.99	5.01	ME-SA	PanAsia-2
9	O/IRN/43/2006	IRN06-43	639	607	0	94.99	5.01	ME-SA	PanAsia-2
10	O/PAK 23.1 8 (EF494490)	PAK06-AI	627	595	0	94.90	5.10	ME-SA	PanAsia-2
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	O/TUR/264/2009* (FMDI)	TUR09-AK	639	601	0	94.05	5.95	ME-SA	PanAsia-2 ^{SAN-09}
2	O/IRN/31/2009	IRN09-31	639	600	0	93.90	6.10	ME-SA	PanAsia-2 ^{FAR-09}
3	O/TUR/257/2008* (FMDI)	TUR08-AD	639	600	0	93.90	6.10	ME-SA	PanAsia-2 ^{TER-08}
4	O/IRN/18/2010	IRN10-18	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{BAL-09}
5	O/IRN/8/2005	IRN05-08	639	595	0	93.11	6.89	ME-SA	PanAsia-2
6	O/IRN/88/2009	IRN09-88	639	593	0	92.80	7.20	ME-SA	PanAsia-2 ^{ANT-10}
7	O/PAK/16/2010	PAK10-16	639	593	0	92.80	7.20	ME-SA	PanAsia-2 ^{PUN-10}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	589	0	92.18	7.82	ME-SA	PanAsia
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	581	0	90.92	9.08	ME-SA	Ind-2001a
10	O/OMN/7/2001 (DQ164941)	OMN01-07	639	578	0	90.45	9.55	ME-SA	Ind-2001b

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O WRLFMD Ref No: PAK/53/2012 Batch No: WRLFMD/2013/00024 Sender Ref: FMD-633 Location: Rahim Yar Khan district, Punjab province, Pakistan Date collected: 12/12/2012 Date received by WRLFMD: 07/11/2013 Date received for sequencing: 03/12/2013 Species: Water Buffalo Material used: BTy1 13/11/2013 Region sequenced: VP1 RT-PCR primers: O-1C244F/EUR-2B52R O-1C272F/EUR-2B52R	Report date: 09/12/2013 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ME-SA Genotype/strain: unnamed Sequence filename: PAK12-53.SEQ Date sequence last updated: 05/12/2013 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 3721 Min. no. of nt for comparison: 600 Total turn-around time: 32 days Sequencing time: 6 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/PAK/40/2012	PAK12-40	639	636	0	99.53	0.47	ME-SA	unnamed
2	O/PAK/41/2012	PAK12-41	639	636	0	99.53	0.47	ME-SA	unnamed
3	O/PAK/51/2012	PAK12-51	639	634	0	99.22	0.78	ME-SA	unnamed
4	O/PAK/22/2013	PAK13-22	639	632	0	98.90	1.10	ME-SA	unnamed
5	O/PAK/55/2012	PAK12-55	639	632	0	98.90	1.10	ME-SA	unnamed
6	O/PAK/31/2007	PAK07-31	639	605	0	94.68	5.32	ME-SA	PanAsia-2
7	O/IRN/11/2006	IRN06-11	639	604	0	94.52	5.48	ME-SA	PanAsia-2
8	O/IRN/29/2006	IRN06-29	639	604	0	94.52	5.48	ME-SA	PanAsia-2
9	O/IRN/43/2006	IRN06-43	639	604	0	94.52	5.48	ME-SA	PanAsia-2
10	O/PAK 23.1 8 (EF494490)	PAK06-AI	627	592	0	94.42	5.58	ME-SA	PanAsia-2
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	O/TUR/264/2009* (FMDI)	TUR09-AK	639	598	0	93.58	6.42	ME-SA	PanAsia-2 ^{SAN-09}
2	O/IRN/31/2009	IRN09-31	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{FAR-09}
3	O/TUR/257/2008* (FMDI)	TUR08-AD	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{TER-08}
4	O/IRN/18/2010	IRN10-18	639	594	0	92.96	7.04	ME-SA	PanAsia-2 ^{BAL-09}
5	O/IRN/8/2005	IRN05-08	639	592	0	92.64	7.36	ME-SA	PanAsia-2
6	O/IRN/88/2009	IRN09-88	639	590	0	92.33	7.67	ME-SA	PanAsia-2 ^{ANT-10}
7	O/PAK/16/2010	PAK10-16	639	590	0	92.33	7.67	ME-SA	PanAsia-2 ^{PUN-10}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	586	0	91.71	8.29	ME-SA	PanAsia
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	580	0	90.77	9.23	ME-SA	Ind-2001a
10	O/OMN/7/2001 (DQ164941)	OMN01-07	639	577	0	90.30	9.70	ME-SA	Ind-2001b

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O WRLFMD Ref No: PAK/55/2012 Batch No: WRLFMD/2013/00024 Sender Ref: FMD-656 Location: Rahim Yar Khan district, Punjab province, Pakistan Date collected: 15/12/2012 Date received by WRLFMD: 07/11/2013 Date received for sequencing: 03/12/2013 Species: Cattle Material used: BTy1 14/11/2013 Region sequenced: VP1 RT-PCR primers: O-1C244F/EUR-2B52R O-1C272F/EUR-2B52R	Report date: 09/12/2013 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ME-SA Genotype/strain: unnamed Sequence filename: PAK12-55.SEQ Date sequence last updated: 05/12/2013 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 3721 Min. no. of nt for comparison: 600 Total turn-around time: 32 days Sequencing time: 6 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/PAK/40/2012	PAK12-40	639	635	0	99.37	0.63	ME-SA	unnamed
2	O/PAK/41/2012	PAK12-41	639	635	0	99.37	0.63	ME-SA	unnamed
3	O/PAK/51/2012	PAK12-51	639	633	0	99.06	0.94	ME-SA	unnamed
4	O/PAK/53/2012	PAK12-53	639	632	0	98.90	1.10	ME-SA	unnamed
5	O/PAK/22/2013	PAK13-22	639	631	0	98.75	1.25	ME-SA	unnamed
6	O/PAK/31/2007	PAK07-31	639	604	0	94.52	5.48	ME-SA	PanAsia-2
7	O/IRN/11/2006	IRN06-11	639	603	0	94.37	5.63	ME-SA	PanAsia-2
8	O/IRN/29/2006	IRN06-29	639	603	0	94.37	5.63	ME-SA	PanAsia-2
9	O/IRN/43/2006	IRN06-43	639	603	0	94.37	5.63	ME-SA	PanAsia-2
10	O/PAK 23.1 8 (EF494490)	PAK06-AI	627	591	0	94.26	5.74	ME-SA	PanAsia-2
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	O/TUR/264/2009* (FMDI)	TUR09-AK	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{SAN-09}
2	O/IRN/31/2009	IRN09-31	639	596	0	93.27	6.73	ME-SA	PanAsia-2 ^{FAR-09}
3	O/TUR/257/2008* (FMDI)	TUR08-AD	639	596	0	93.27	6.73	ME-SA	PanAsia-2 ^{TER-08}
4	O/IRN/8/2005	IRN05-08	639	593	0	92.80	7.20	ME-SA	PanAsia-2
5	O/IRN/18/2010	IRN10-18	639	591	0	92.49	7.51	ME-SA	PanAsia-2 ^{BAL-09}
6	O/IRN/88/2009	IRN09-88	639	589	0	92.18	7.82	ME-SA	PanAsia-2 ^{ANT-10}
7	O/PAK/16/2010	PAK10-16	639	589	0	92.18	7.82	ME-SA	PanAsia-2 ^{PUN-10}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	583	0	91.24	8.76	ME-SA	PanAsia
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	577	0	90.30	9.70	ME-SA	Ind-2001a
10	O/OMN/7/2001 (DQ164941)	OMN01-07	639	574	0	89.83	10.17	ME-SA	Ind-2001b

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O WRLFMD Ref No: PAK/3/2013 Batch No: WRLFMD/2013/00024 Sender Ref: FMD-868 Location: Rahim Yar Khan district, Punjab province, Pakistan Date collected: 28/01/2013 Date received by WRLFMD: 07/11/2013 Date received for sequencing: 03/12/2013 Species: Water Buffalo Material used: BTy1 14/11/2013 Region sequenced: VP1 RT-PCR primers: O-1C244F/EUR-2B52R O-1C272F/EUR-2B52R	Report date: 09/12/2013 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ME-SA Genotype/strain: PanAsia-2 ^{ANT-10} Sequence filename: PAK13-03.SEQ Date sequence last updated: 05/12/2013 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 3721 Min. no. of nt for comparison: 600 Total turn-around time: 32 days Sequencing time: 6 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/AFG/59/2010	AFG10-59	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
2	O/AFG/61/2010	AFG10-61	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
3	O/AFG/89/2010	AFG10-89	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
4	O/IRN/35/2010	IRN10-35	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
5	O/IRN/83/2010	IRN10-83	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
6	O/IRN/96/2010	IRN10-96	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
7	O/AFG/110/2010	AFG10110	639	625	0	97.81	2.19	ME-SA	PanAsia-2 ^{ANT-10}
8	O/AFG/32/2010	AFG10-32	639	625	0	97.81	2.19	ME-SA	PanAsia-2 ^{ANT-10}
9	O/AFG/34/2010	AFG10-34	639	625	0	97.81	2.19	ME-SA	PanAsia-2 ^{ANT-10}
10	O/IRN/139/2010	IRN10139	639	625	0	97.81	2.19	ME-SA	PanAsia-2 ^{ANT-10}
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	O/IRN/88/2009	IRN09-88	639	622	0	97.34	2.66	ME-SA	PanAsia-2 ^{ANT-10}
2	O/IRN/31/2009	IRN09-31	639	601	0	94.05	5.95	ME-SA	PanAsia-2 ^{FAR-09}
3	O/IRN/8/2005	IRN05-08	639	599	0	93.74	6.26	ME-SA	PanAsia-2
4	O/TUR/257/2008* (FMDI)	TUR08-AD	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{TER-08}
5	O/TUR/264/2009* (FMDI)	TUR09-AK	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{SAN-09}
6	O/PAK/16/2010	PAK10-16	639	589	0	92.18	7.82	ME-SA	PanAsia-2 ^{PUN-10}
7	O/IRN/18/2010	IRN10-18	639	588	0	92.02	7.98	ME-SA	PanAsia-2 ^{BAL-09}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	578	0	90.45	9.55	ME-SA	PanAsia
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	569	0	89.05	10.95	ME-SA	Ind-2001a
10	O/OMN/7/2001 (DQ164941)	OMN01-07	639	569	0	89.05	10.95	ME-SA	Ind-2001b

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O WRLFMD Ref No: PAK/4/2013 Batch No: WRLFMD/2013/00024 Sender Ref: FMD-871 Location: Faisalabad, Punjab province, Pakistan Date collected: 29/01/2013 Date received by WRLFMD: 07/11/2013 Date received for sequencing: 03/12/2013 Species: Cattle Material used: BTy1 15/11/2013 Region sequenced: VP1 RT-PCR primers: O-1C244F/EUR-2B52R O-1C272F/EUR-2B52R	Report date: 09/12/2013 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ME-SA Genotype/strain: PanAsia-2 Sequence filename: PAK13-04.SEQ Date sequence last updated: 05/12/2013 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 3721 Min. no. of nt for comparison: 600 Total turn-around time: 32 days Sequencing time: 6 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/AFG/148/2010	AFG10148	639	619	0	96.87	3.13	ME-SA	PanAsia-2
2	O/AFG/30/2010	AFG10-30	639	618	0	96.71	3.29	ME-SA	PanAsia-2
3	O/IRN/56/2006	IRN06-56	639	615	0	96.24	3.76	ME-SA	PanAsia-2
4	O/AFG/45/2007	AFG07-45	639	614	0	96.09	3.91	ME-SA	PanAsia-2
5	O/KAZ/2007 (ARRIAH)	KAZ07-AA	639	614	0	96.09	3.91	ME-SA	PanAsia-2
6	O/PAK/10/2006	PAK06-10	639	614	0	96.09	3.91	ME-SA	PanAsia-2
7	O/PAK/10/2006 (EF494503)	PAK06-AE	639	614	0	96.09	3.91	ME-SA	PanAsia-2
8	O/PAK/16/2006	PAK06-16	639	614	0	96.09	3.91	ME-SA	PanAsia-2
9	O/PAK/4/2006	PAK06-04	639	614	0	96.09	3.91	ME-SA	PanAsia-2
10	O/PAK/4/2006 (EF494500)	PAK06-AB	639	614	0	96.09	3.91	ME-SA	PanAsia-2
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	O/IRN/8/2005	IRN05-08	639	608	0	95.15	4.85	ME-SA	PanAsia-2
2	O/TUR/257/2008* (FMDI)	TUR08-AD	639	604	0	94.52	5.48	ME-SA	PanAsia-2 ^{TER-08}
3	O/IRN/18/2010	IRN10-18	639	601	0	94.05	5.95	ME-SA	PanAsia-2 ^{BAL-09}
4	O/IRN/31/2009	IRN09-31	639	601	0	94.05	5.95	ME-SA	PanAsia-2 ^{FAR-09}
5	O/PAK/16/2010	PAK10-16	639	598	0	93.58	6.42	ME-SA	PanAsia-2 ^{PUN-10}
6	O/TUR/264/2009* (FMDI)	TUR09-AK	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{SAN-09}
7	O/IRN/88/2009	IRN09-88	639	595	0	93.11	6.89	ME-SA	PanAsia-2 ^{ANT-10}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	590	0	92.33	7.67	ME-SA	PanAsia
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	581	0	90.92	9.08	ME-SA	Ind-2001a
10	O/BHU/3/2009	BHU09-03	639	577	0	90.30	9.70	ME-SA	Ind-2001d

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O	Report date: 09/12/2013
WRLFMD Ref No: PAK/12/2013	Reported by: N.J. Knowles
Batch No: WRLFMD/2013/00024	Checked by: K. Bachanek-Bankowska
Sender Ref: FMD-1108	
Location: Sargodha district, Punjab province, Pakistan	Topotype: ME-SA
Date collected: 26/03/2013	Genotype/strain: PanAsia-2 ^{ANT-10}
Date received by WRLFMD: 07/11/2013	Sequence filename: PAK13-12.SEQ
Date received for sequencing: 03/12/2013	Date sequence last updated: 05/12/2013
Species: Cattle	No. of Nt determined: 639
Material used: BTy1 19/11/2013	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: O-1C244F/EUR-2B52R	Total no. of comparisons: 3721
O-1C272F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 32 days
	Sequencing time: 6 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/PAK/15/2013	PAK13-15	639	638	0	99.84	0.16	ME-SA	PanAsia-2 ^{ANT-10}
2	O/PAK/16/2013	PAK13-16	639	638	0	99.84	0.16	ME-SA	PanAsia-2 ^{ANT-10}
3	O/PAK/20/2013	PAK13-20	639	635	0	99.37	0.63	ME-SA	PanAsia-2 ^{ANT-10}
4	O/PAK/24/2013	PAK13-24	639	635	0	99.37	0.63	ME-SA	PanAsia-2 ^{ANT-10}
5	O/AFG/19/2011	AFG11-19	639	628	0	98.28	1.72	ME-SA	PanAsia-2 ^{ANT-10}
6	O/AFG/256/2010	AFG10256	639	628	0	98.28	1.72	ME-SA	PanAsia-2 ^{ANT-10}
7	O/AFG/259/2010	AFG10259	639	628	0	98.28	1.72	ME-SA	PanAsia-2 ^{ANT-10}
8	O/AFG/35/2011	AFG11-35	639	628	0	98.28	1.72	ME-SA	PanAsia-2 ^{ANT-10}
9	O/AFG/61/2011	AFG11-61	639	628	0	98.28	1.72	ME-SA	PanAsia-2 ^{ANT-10}
10	O/AFG/64/2011	AFG11-64	639	628	0	98.28	1.72	ME-SA	PanAsia-2 ^{ANT-10}
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	O/IRN/88/2009	IRN09-88	639	622	0	97.34	2.66	ME-SA	PanAsia-2 ^{ANT-10}
2	O/IRN/31/2009	IRN09-31	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{FAR-09}
3	O/IRN/8/2005	IRN05-08	639	597	0	93.43	6.57	ME-SA	PanAsia-2
4	O/TUR/257/2008* (FMDI)	TUR08-AD	639	596	0	93.27	6.73	ME-SA	PanAsia-2 ^{TER-08}
5	O/IRN/18/2010	IRN10-18	639	594	0	92.96	7.04	ME-SA	PanAsia-2 ^{BAL-09}
6	O/PAK/16/2010	PAK10-16	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{PUN-10}
7	O/TUR/264/2009* (FMDI)	TUR09-AK	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{SAN-09}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	582	0	91.08	8.92	ME-SA	PanAsia
9	O/IRN/61/2001 (DQ164896)	IRN01-61	638	567	1	88.87	11.13	ME-SA	Irn-2001
10	O/KUW/3/97 (DQ164904)	KUW97-03	639	567	0	88.73	11.27	ME-SA	Ind-2001a

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O WRLFMD Ref No: PAK/15/2013 Batch No: WRLFMD/2013/00024 Sender Ref: FMD-1146 Location: Sargodha district, Punjab province, Pakistan Date collected: 10/04/2013 Date received by WRLFMD: 07/11/2013 Date received for sequencing: 03/12/2013 Species: Cattle Material used: BTy1 20/11/2013 Region sequenced: VP1 RT-PCR primers: O-1C244F/EUR-2B52R O-1C272F/EUR-2B52R	Report date: 09/12/2013 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ME-SA Genotype/strain: PanAsia-2 ^{ANT-10} Sequence filename: PAK13-15.SEQ Date sequence last updated: 05/12/2013 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 3721 Min. no. of nt for comparison: 600 Total turn-around time: 32 days Sequencing time: 6 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/PAK/12/2013	PAK13-12	639	638	0	99.84	0.16	ME-SA	PanAsia-2 ^{ANT-10}
2	O/PAK/16/2013	PAK13-16	639	637	0	99.69	0.31	ME-SA	PanAsia-2 ^{ANT-10}
3	O/PAK/20/2013	PAK13-20	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{ANT-10}
4	O/PAK/24/2013	PAK13-24	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{ANT-10}
5	O/AFG/19/2011	AFG11-19	639	627	0	98.12	1.88	ME-SA	PanAsia-2 ^{ANT-10}
6	O/AFG/256/2010	AFG10256	639	627	0	98.12	1.88	ME-SA	PanAsia-2 ^{ANT-10}
7	O/AFG/259/2010	AFG10259	639	627	0	98.12	1.88	ME-SA	PanAsia-2 ^{ANT-10}
8	O/AFG/35/2011	AFG11-35	639	627	0	98.12	1.88	ME-SA	PanAsia-2 ^{ANT-10}
9	O/AFG/61/2011	AFG11-61	639	627	0	98.12	1.88	ME-SA	PanAsia-2 ^{ANT-10}
10	O/AFG/64/2011	AFG11-64	639	627	0	98.12	1.88	ME-SA	PanAsia-2 ^{ANT-10}
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	O/IRN/88/2009	IRN09-88	639	621	0	97.18	2.82	ME-SA	PanAsia-2 ^{ANT-10}
2	O/IRN/31/2009	IRN09-31	639	596	0	93.27	6.73	ME-SA	PanAsia-2 ^{FAR-09}
3	O/IRN/8/2005	IRN05-08	639	596	0	93.27	6.73	ME-SA	PanAsia-2
4	O/TUR/257/2008* (FMDI)	TUR08-AD	639	595	0	93.11	6.89	ME-SA	PanAsia-2 ^{TER-08}
5	O/IRN/18/2010	IRN10-18	639	593	0	92.80	7.20	ME-SA	PanAsia-2 ^{BAL-09}
6	O/PAK/16/2010	PAK10-16	639	591	0	92.49	7.51	ME-SA	PanAsia-2 ^{PUN-10}
7	O/TUR/264/2009* (FMDI)	TUR09-AK	639	591	0	92.49	7.51	ME-SA	PanAsia-2 ^{SAN-09}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	581	0	90.92	9.08	ME-SA	PanAsia
9	O/IRN/61/2001 (DQ164896)	IRN01-61	638	566	1	88.71	11.29	ME-SA	Irn-2001
10	O/KUW/3/97 (DQ164904)	KUW97-03	639	566	0	88.58	11.42	ME-SA	Ind-2001a

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O WRLFMD Ref No: PAK/16/2013 Batch No: WRLFMD/2013/00024 Sender Ref: FMD-1089 Location: Layyah district, Punjab province, Pakistan Date collected: 17/04/2013 Date received by WRLFMD: 07/11/2013 Date received for sequencing: 03/12/2013 Species: Cattle Material used: BTy2 28/11/2013 Region sequenced: VP1 RT-PCR primers: O-1C244F/EUR-2B52R O-1C272F/EUR-2B52R	Report date: 09/12/2013 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ME-SA Genotype/strain: PanAsia-2 ^{ANT-10} Sequence filename: PAK13-16.SEQ Date sequence last updated: 05/12/2013 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 3721 Min. no. of nt for comparison: 600 Total turn-around time: 32 days Sequencing time: 6 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/PAK/12/2013	PAK13-12	639	638	0	99.84	0.16	ME-SA	PanAsia-2 ^{ANT-10}
2	O/PAK/15/2013	PAK13-15	639	637	0	99.69	0.31	ME-SA	PanAsia-2 ^{ANT-10}
3	O/PAK/20/2013	PAK13-20	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{ANT-10}
4	O/PAK/24/2013	PAK13-24	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{ANT-10}
5	O/AFG/19/2011	AFG11-19	639	629	0	98.44	1.56	ME-SA	PanAsia-2 ^{ANT-10}
6	O/AFG/256/2010	AFG10256	639	629	0	98.44	1.56	ME-SA	PanAsia-2 ^{ANT-10}
7	O/AFG/259/2010	AFG10259	639	629	0	98.44	1.56	ME-SA	PanAsia-2 ^{ANT-10}
8	O/AFG/35/2011	AFG11-35	639	629	0	98.44	1.56	ME-SA	PanAsia-2 ^{ANT-10}
9	O/AFG/61/2011	AFG11-61	639	629	0	98.44	1.56	ME-SA	PanAsia-2 ^{ANT-10}
10	O/AFG/64/2011	AFG11-64	639	629	0	98.44	1.56	ME-SA	PanAsia-2 ^{ANT-10}
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	O/IRN/88/2009	IRN09-88	639	623	0	97.50	2.50	ME-SA	PanAsia-2 ^{ANT-10}
2	O/IRN/31/2009	IRN09-31	639	598	0	93.58	6.42	ME-SA	PanAsia-2 ^{FAR-09}
3	O/IRN/8/2005	IRN05-08	639	598	0	93.58	6.42	ME-SA	PanAsia-2
4	O/TUR/257/2008* (FMDI)	TUR08-AD	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{TER-08}
5	O/IRN/18/2010	IRN10-18	639	595	0	93.11	6.89	ME-SA	PanAsia-2 ^{BAL-09}
6	O/PAK/16/2010	PAK10-16	639	593	0	92.80	7.20	ME-SA	PanAsia-2 ^{PUN-10}
7	O/TUR/264/2009* (FMDI)	TUR09-AK	639	593	0	92.80	7.20	ME-SA	PanAsia-2 ^{SAN-09}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	583	0	91.24	8.76	ME-SA	PanAsia
9	O/IRN/61/2001 (DQ164896)	IRN01-61	638	568	1	89.03	10.97	ME-SA	Irn-2001
10	O/KUW/3/97 (DQ164904)	KUW97-03	639	568	0	88.89	11.11	ME-SA	Ind-2001a

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O	Report date: 09/12/2013
WRLFMD Ref No: PAK/20/2013	Reported by: N.J. Knowles
Batch No: WRLFMD/2013/00024	Checked by: K. Bachanek-Bankowska
Sender Ref: FMD-1140	
Location: Sargodha district, Punjab province, Pakistan	Topotype: ME-SA
Date collected: 16/05/2013	Genotype/strain: PanAsia-2 ^{ANT-10}
Date received by WRLFMD: 07/11/2013	Sequence filename: PAK13-20.SEQ
Date received for sequencing: 03/12/2013	Date sequence last updated: 05/12/2013
Species: Cattle	No. of Nt determined: 639
Material used: BTy2 23/11/2013	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: O-1C244F/EUR-2B52R	Total no. of comparisons: 3721
O-1C272F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 32 days
	Sequencing time: 6 days
Comments:	

Most Closely Related Viruses

Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/PAK/24/2013	PAK13-24	639	639	0	100.00	0.00	ME-SA	PanAsia-2 ^{ANT-10}
2	O/PAK/15/2013	PAK13-15	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{ANT-10}
3	O/PAK/16/2013	PAK13-16	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{ANT-10}
4	O/PAK/12/2013	PAK13-12	639	635	0	99.37	0.63	ME-SA	PanAsia-2 ^{ANT-10}
5	O/AFG/19/2011	AFG11-19	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
6	O/AFG/256/2010	AFG10256	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
7	O/AFG/259/2010	AFG10259	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
8	O/AFG/35/2011	AFG11-35	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
9	O/AFG/61/2011	AFG11-61	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
10	O/AFG/64/2011	AFG11-64	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}

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	O/IRN/88/2009	IRN09-88	639	620	0	97.03	2.97	ME-SA	PanAsia-2 ^{ANT-10}
2	O/IRN/31/2009	IRN09-31	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{FAR-09}
3	O/TUR/257/2008* (FMDI)	TUR08-AD	639	596	0	93.27	6.73	ME-SA	PanAsia-2 ^{TER-08}
4	O/IRN/8/2005	IRN05-08	639	595	0	93.11	6.89	ME-SA	PanAsia-2
5	O/IRN/18/2010	IRN10-18	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{BAL-09}
6	O/PAK/16/2010	PAK10-16	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{PUN-10}
7	O/TUR/264/2009* (FMDI)	TUR09-AK	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{SAN-09}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	582	0	91.08	8.92	ME-SA	PanAsia
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	568	0	88.89	11.11	ME-SA	Ind-2001a
10	O/IRN/61/2001 (DQ164896)	IRN01-61	638	567	1	88.87	11.13	ME-SA	Irn-2001

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O	Report date: 09/12/2013
WRLFMD Ref No: PAK/22/2013	Reported by: N.J. Knowles
Batch No: WRLFMD/2013/00024	Checked by: K. Bachanek-Bankowska
Sender Ref: FMD-1387	
Location: Karachi, Sindh province, Pakistan	Topotype: ME-SA
Date collected: 25/05/2013	Genotype/strain: unnamed
Date received by WRLFMD: 07/11/2013	Sequence filename: PAK13-22.SEQ
Date received for sequencing: 03/12/2013	Date sequence last updated: 05/12/2013
Species: Water Buffalo	No. of Nt determined: 639
Material used: BTy1 20/11/2013	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: O-1C244F/EUR-2B52R	Total no. of comparisons: 3721
O-1C272F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 32 days
	Sequencing time: 6 days
Comments:	

Most Closely Related Viruses									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/PAK/40/2012	PAK12-40	639	635	0	99.37	0.63	ME-SA	unnamed
2	O/PAK/41/2012	PAK12-41	639	635	0	99.37	0.63	ME-SA	unnamed
3	O/PAK/51/2012	PAK12-51	639	633	0	99.06	0.94	ME-SA	unnamed
4	O/PAK/53/2012	PAK12-53	639	632	0	98.90	1.10	ME-SA	unnamed
5	O/PAK/55/2012	PAK12-55	639	631	0	98.75	1.25	ME-SA	unnamed
6	O/PAK/31/2007	PAK07-31	639	604	0	94.52	5.48	ME-SA	PanAsia-2
7	O/PAK 23.1 8 (EF494490)	PAK06-AI	627	592	0	94.42	5.58	ME-SA	PanAsia-2
8	O/IRN/11/2006	IRN06-11	639	603	0	94.37	5.63	ME-SA	PanAsia-2
9	O/IRN/29/2006	IRN06-29	639	603	0	94.37	5.63	ME-SA	PanAsia-2
10	O/IRN/43/2006	IRN06-43	639	603	0	94.37	5.63	ME-SA	PanAsia-2
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	O/TUR/264/2009* (FMDI)	TUR09-AK	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{SAN-09}
2	O/IRN/31/2009	IRN09-31	639	596	0	93.27	6.73	ME-SA	PanAsia-2 ^{FAR-09}
3	O/TUR/257/2008* (FMDI)	TUR08-AD	639	596	0	93.27	6.73	ME-SA	PanAsia-2 ^{TER-08}
4	O/IRN/18/2010	IRN10-18	639	591	0	92.49	7.51	ME-SA	PanAsia-2 ^{BAL-09}
5	O/IRN/8/2005	IRN05-08	639	591	0	92.49	7.51	ME-SA	PanAsia-2
6	O/IRN/88/2009	IRN09-88	639	589	0	92.18	7.82	ME-SA	PanAsia-2 ^{ANT-10}
7	O/PAK/16/2010	PAK10-16	639	589	0	92.18	7.82	ME-SA	PanAsia-2 ^{PUN-10}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	584	0	91.39	8.61	ME-SA	PanAsia
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	579	0	90.61	9.39	ME-SA	Ind-2001a
10	O/BHU/1/2013	BHU13-01	639	575	0	89.98	10.02	ME-SA	Ind-2001 ^{KAR-13}

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O WRLFMD Ref No: PAK/24/2013 Batch No: WRLFMD/2013/00024 Sender Ref: FMD-1139 Location: Jhang district, Punjab province, Pakistan Date collected: 10/06/2013 Date received by WRLFMD: 07/11/2013 Date received for sequencing: 03/12/2013 Species: Water Buffalo Material used: BTy1 20/11/2013 Region sequenced: VP1 RT-PCR primers: O-1C244F/EUR-2B52R O-1C272F/EUR-2B52R	Report date: 09/12/2013 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ME-SA Genotype/strain: PanAsia-2 ^{ANT-10} Sequence filename: PAK13-24.SEQ Date sequence last updated: 05/12/2013 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 3721 Min. no. of nt for comparison: 600 Total turn-around time: 32 days Sequencing time: 6 days
Comments:	

Most Closely Related Viruses

Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	O/PAK/20/2013	PAK13-20	639	639	0	100.00	0.00	ME-SA	PanAsia-2 ^{ANT-10}
2	O/PAK/15/2013	PAK13-15	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{ANT-10}
3	O/PAK/16/2013	PAK13-16	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{ANT-10}
4	O/PAK/12/2013	PAK13-12	639	635	0	99.37	0.63	ME-SA	PanAsia-2 ^{ANT-10}
5	O/AFG/19/2011	AFG11-19	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
6	O/AFG/256/2010	AFG10256	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
7	O/AFG/259/2010	AFG10259	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
8	O/AFG/35/2011	AFG11-35	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
9	O/AFG/61/2011	AFG11-61	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}
10	O/AFG/64/2011	AFG11-64	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{ANT-10}

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	O/IRN/88/2009	IRN09-88	639	620	0	97.03	2.97	ME-SA	PanAsia-2 ^{ANT-10}
2	O/IRN/31/2009	IRN09-31	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{FAR-09}
3	O/TUR/257/2008* (FMDI)	TUR08-AD	639	596	0	93.27	6.73	ME-SA	PanAsia-2 ^{TER-08}
4	O/IRN/8/2005	IRN05-08	639	595	0	93.11	6.89	ME-SA	PanAsia-2
5	O/IRN/18/2010	IRN10-18	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{BAL-09}
6	O/PAK/16/2010	PAK10-16	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{PUN-10}
7	O/TUR/264/2009* (FMDI)	TUR09-AK	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{SAN-09}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	582	0	91.08	8.92	ME-SA	PanAsia
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	568	0	88.89	11.11	ME-SA	Ind-2001a
10	O/IRN/61/2001 (DQ164896)	IRN01-61	638	567	1	88.87	11.13	ME-SA	Irn-2001

nt, nucleotides

*, not a WRLFMD reference number

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Report on FMDV O in Pakistan in 2012-2013

Batch: WRLFMD/2013/00024

◆ indicates viruses in this batch

Software: MEGA 5.2

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 : 642

No Of Bootstrap Reps = 1000

Only bootstrap values of 70% and above are shown

*, not a WRLFMD Ref. No.

N.J. Knowles, K. Bachanek-Bankowska & J. Wadsworth,
09 December 2013

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