

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

Genotyping Report

Report Date for this Batch: 26 November 2015

FMDV type O

Country: Turkey

Period: 2014-2015

No. of samples: 4

BATCH: WRLFMD/2015/00015



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Comment: It is not clear if O/TUR/10/2015 and O/TUR/17/2015 (along with five viruses from Iran sampled in 2013) belong to the FAR-09 sub-lineage or if they represent a new sub-lineage.

FAO World Reference Laboratory for FMD Genotyping Report

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Serotype: O	Report date: 25/11/2015
WRLFMD Ref No: TUR/33/2014	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00015	Checked by: K. Bachanek-Bankowska
Sender Ref: (3) 318	
Location: Aga, Merkez, Duzce, Turkey	Topotype: ME-SA
Date collected: 03/09/2014	Genotype/strain: PanAsia-2 ^{FAR-09}
Date received by WRLFMD: 12/08/2015	Sequence filename: TUR14-33.SEQ
Date received for sequencing: 29/10/2015	Date sequence last updated: 25/11/2015
Species: Cattle	No. of Nt determined: 639
Material used: BTy1 08/10/2015	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: O-1C244F/EUR-2B52R	Total no. of comparisons: 4183
O-1C272F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 105 days
	Sequencing time: 27 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/TUR/14/2014	TUR14-14	639	634	0	99.22	0.78	ME-SA	PanAsia-2 ^{FAR-09}
2	O/TUR/24/2014	TUR14-24	639	634	0	99.22	0.78	ME-SA	PanAsia-2 ^{FAR-09}
3	O/TUR/15/2014	TUR14-15	639	633	0	99.06	0.94	ME-SA	PanAsia-2 ^{FAR-09}
4	O/TUR/13/2014	TUR14-13	639	632	0	98.90	1.10	ME-SA	PanAsia-2 ^{FAR-09}
5	O/TUR/17/2014	TUR14-17	639	632	0	98.90	1.10	ME-SA	PanAsia-2 ^{FAR-09}
6	O/TUR/9/2014	TUR14-09	639	632	0	98.90	1.10	ME-SA	PanAsia-2 ^{FAR-09}
7	O/TUR/11/2014	TUR14-11	639	631	0	98.75	1.25	ME-SA	PanAsia-2 ^{FAR-09}
8	O/TUR/34/2014	TUR14-34	639	631	0	98.75	1.25	ME-SA	PanAsia-2 ^{FAR-09}
9	O/Agri/TUR/63/2013 (FMDI)	TUR13-AA	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{FAR-09}
10	O/Agri/TUR/478/2013 (FMDI)	TUR13-AB	639	624	0	97.65	2.35	ME-SA	PanAsia-2 ^{FAR-09}

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/31/2009	IRN09-31	639	621	0	97.18	2.82	ME-SA	PanAsia-2 ^{FAR-09}
2	O/IRN/8/2005	IRN05-08	639	601	0	94.05	5.95	ME-SA	PanAsia-2
3	O/TUR/257/2008* (FMDI)	TUR08-AD	639	599	0	93.74	6.26	ME-SA	PanAsia-2 ^{TER-08}
4	O/TUR/264/2009* (FMDI)	TUR09-AK	639	598	0	93.58	6.42	ME-SA	PanAsia-2 ^{SAN-09}
5	O/IRN/18/2010	IRN10-18	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{BAL-09}
6	O/PAK/16/2010	PAK10-16	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{PUN-10}
7	O/IRN/88/2009	IRN09-88	639	592	0	92.64	7.36	ME-SA	PanAsia-2 ^{ANT-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	575	0	89.98	10.02	ME-SA	Ind-2001a
10	O/OMN/7/2001 (DQ164941)	OMN01-07	639	571	0	89.36	10.64	ME-SA	Ind-2001b

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O	Report date: 25/11/2015
WRLFMD Ref No: TUR/34/2014	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00015	Checked by: K. Bachanek-Bankowska
Sender Ref: (4) 322	
Location: Esmetas, Solhan, Bingol, Turkey	Topotype: ME-SA
Date collected: 04/09/2014	Genotype/strain: PanAsia-2 ^{FAR-09}
Date received by WRLFMD: 12/08/2015	Sequence filename: TUR14-34.SEQ
Date received for sequencing: 29/10/2015	Date sequence last updated: 25/11/2015
Species: Cattle	No. of Nt determined: 639
Material used: BTy1 09/10/2015	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: O-1C244F/EUR-2B52R	Total no. of comparisons: 4183
O-1C272F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 105 days
	Sequencing time: 27 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/TUR/14/2014	TUR14-14	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{FAR-09}
2	O/TUR/24/2014	TUR14-24	639	636	0	99.53	0.47	ME-SA	PanAsia-2 ^{FAR-09}
3	O/TUR/15/2014	TUR14-15	639	635	0	99.37	0.63	ME-SA	PanAsia-2 ^{FAR-09}
4	O/TUR/13/2014	TUR14-13	639	634	0	99.22	0.78	ME-SA	PanAsia-2 ^{FAR-09}
5	O/TUR/17/2014	TUR14-17	639	634	0	99.22	0.78	ME-SA	PanAsia-2 ^{FAR-09}
6	O/TUR/9/2014	TUR14-09	639	634	0	99.22	0.78	ME-SA	PanAsia-2 ^{FAR-09}
7	O/TUR/11/2014	TUR14-11	639	633	0	99.06	0.94	ME-SA	PanAsia-2 ^{FAR-09}
8	O/TUR/33/2014	TUR14-33	639	631	0	98.75	1.25	ME-SA	PanAsia-2 ^{FAR-09}
9	O/Agri/TUR/63/2013 (FMDI)	TUR13-AA	639	628	0	98.28	1.72	ME-SA	PanAsia-2 ^{FAR-09}
10	O/Agri/TUR/478/2013 (FMDI)	TUR13-AB	639	626	0	97.97	2.03	ME-SA	PanAsia-2 ^{FAR-09}

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/31/2009	IRN09-31	639	621	0	97.18	2.82	ME-SA	PanAsia-2 ^{FAR-09}
2	O/IRN/8/2005	IRN05-08	639	603	0	94.37	5.63	ME-SA	PanAsia-2
3	O/IRN/18/2010	IRN10-18	639	601	0	94.05	5.95	ME-SA	PanAsia-2 ^{BAL-09}
4	O/PAK/16/2010	PAK10-16	639	601	0	94.05	5.95	ME-SA	PanAsia-2 ^{PUN-10}
5	O/TUR/257/2008* (FMDI)	TUR08-AD	639	599	0	93.74	6.26	ME-SA	PanAsia-2 ^{TER-08}
6	O/TUR/264/2009* (FMDI)	TUR09-AK	639	598	0	93.58	6.42	ME-SA	PanAsia-2 ^{SAN-09}
7	O/IRN/88/2009	IRN09-88	639	594	0	92.96	7.04	ME-SA	PanAsia-2 ^{ANT-10}
8	O/UKG/35/2001 (AJ539141)	UKG01-35	639	591	0	92.49	7.51	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	573	0	89.67	10.33	ME-SA	Ind-2001b

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O	Report date: 25/11/2015
WRLFMD Ref No: TUR/10/2015	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00015	Checked by: K. Bachanek-Bankowska
Sender Ref: (19) 76	
Location: Yesilyurt, Haymana, Ankara, Turkey	Topotype: ME-SA
Date collected: 27/03/2015	Genotype/strain: PanAsia-2 ^{FAR-09?}
Date received by WRLFMD: 12/08/2015	Sequence filename: TUR15-10.SEQ
Date received for sequencing: 29/10/2015	Date sequence last updated: 25/11/2015
Species: Sheep	No. of Nt determined: 639
Material used: BTy1 20/10/2015	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: O-1C244F/EUR-2B52R	Total no. of comparisons: 4183
O-1C272F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 105 days
	Sequencing time: 27 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/TUR/17/2015	TUR15-17	639	635	0	99.37	0.63	ME-SA	PanAsia-2 ^{FAR-09?}
2	O/IRN/29/2013	IRN13-29	639	625	0	97.81	2.19	ME-SA	PanAsia-2 ^{FAR-09?}
3	O/IRN/23/2013	IRN13-23	639	624	0	97.65	2.35	ME-SA	PanAsia-2 ^{FAR-09?}
4	O/IRN/22/2013	IRN13-22	639	622	0	97.34	2.66	ME-SA	PanAsia-2 ^{FAR-09?}
5	O/IRN/17/2013	IRN13-17	639	620	0	97.03	2.97	ME-SA	PanAsia-2 ^{FAR-09?}
6	O/IRN/30/2013	IRN13-30	639	620	0	97.03	2.97	ME-SA	PanAsia-2 ^{FAR-09?}
7	O/IRN 3921/2012*	IRN12-AN	639	613	0	95.93	4.07	ME-SA	PanAsia-2 ^{FAR-09}
8	O/IRN 3922/2012*	IRN12-AO	639	613	0	95.93	4.07	ME-SA	PanAsia-2 ^{FAR-09}
9	O/SAU/1/2009	SAU09-01	639	613	0	95.93	4.07	ME-SA	PanAsia-2 ^{FAR-09}
10	O/SAU/2/2009	SAU09-02	639	613	0	95.93	4.07	ME-SA	PanAsia-2 ^{FAR-09}
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/31/2009	IRN09-31	639	611	0	95.62	4.38	ME-SA	PanAsia-2 ^{FAR-09}
2	O/IRN/8/2005	IRN05-08	639	598	0	93.58	6.42	ME-SA	PanAsia-2
3	O/IRN/18/2010	IRN10-18	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{BAL-09}
4	O/TUR/257/2008* (FMDI)	TUR08-AD	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{TER-08}
5	O/PAK/16/2010	PAK10-16	639	594	0	92.96	7.04	ME-SA	PanAsia-2 ^{PUN-10}
6	O/TUR/264/2009* (FMDI)	TUR09-AK	639	590	0	92.33	7.67	ME-SA	PanAsia-2 ^{SAN-09}
7	O/UKG/35/2001 (AJ539141)	UKG01-35	639	589	0	92.18	7.82	ME-SA	PanAsia
8	O/IRN/88/2009	IRN09-88	639	587	0	91.86	8.14	ME-SA	PanAsia-2 ^{ANT-10}
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	578	0	90.45	9.55	ME-SA	Ind-2001a
10	O/OMN/7/2001 (DQ164941)	OMN01-07	639	571	0	89.36	10.64	ME-SA	Ind-2001b

nt, nucleotides

*, not a WRLFMD reference number

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Serotype: O WRLFMD Ref No: TUR/17/2015 Batch No: WRLFMD/2015/00015 Sender Ref: (27) 109 Location: Sevinc, Odunpazari, Eskisehir, Turkey Date collected: 13/05/2015 Date received by WRLFMD: 12/08/2015 Date received for sequencing: 10/11/2015 Species: Cattle Material used: BTy1 23/10/2015 Region sequenced: VP1 RT-PCR primers: O-1C244F/EUR-2B52R O-1C272F/EUR-2B52R	Report date: 25/11/2015 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ME-SA Genotype/strain: PanAsia-2 ^{FAR-09?} Sequence filename: TUR15-17.SEQ Date sequence last updated: 25/11/2015 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 4183 Min. no. of nt for comparison: 600 Total turn-around time: 105 days Sequencing time: 15 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/TUR/10/2015	TUR15-10	639	635	0	99.37	0.63	ME-SA	PanAsia-2 ^{FAR-09?}
2	O/IRN/29/2013	IRN13-29	639	625	0	97.81	2.19	ME-SA	PanAsia-2 ^{FAR-09?}
3	O/IRN/23/2013	IRN13-23	639	624	0	97.65	2.35	ME-SA	PanAsia-2 ^{FAR-09?}
4	O/IRN/22/2013	IRN13-22	639	622	0	97.34	2.66	ME-SA	PanAsia-2 ^{FAR-09?}
5	O/IRN/17/2013	IRN13-17	639	620	0	97.03	2.97	ME-SA	PanAsia-2 ^{FAR-09?}
6	O/IRN/30/2013	IRN13-30	639	620	0	97.03	2.97	ME-SA	PanAsia-2 ^{FAR-09?}
7	O/IRN 3921/2012*	IRN12-AN	639	613	0	95.93	4.07	ME-SA	PanAsia-2 ^{FAR-09}
8	O/IRN 3922/2012*	IRN12-AO	639	613	0	95.93	4.07	ME-SA	PanAsia-2 ^{FAR-09}
9	O/SAU/1/2009	SAU09-01	639	613	0	95.93	4.07	ME-SA	PanAsia-2 ^{FAR-09}
10	O/SAU/2/2009	SAU09-02	639	613	0	95.93	4.07	ME-SA	PanAsia-2 ^{FAR-09}
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/31/2009	IRN09-31	639	611	0	95.62	4.38	ME-SA	PanAsia-2 ^{FAR-09}
2	O/IRN/8/2005	IRN05-08	639	598	0	93.58	6.42	ME-SA	PanAsia-2
3	O/IRN/18/2010	IRN10-18	639	597	0	93.43	6.57	ME-SA	PanAsia-2 ^{BAL-09}
4	O/PAK/16/2010	PAK10-16	639	595	0	93.11	6.89	ME-SA	PanAsia-2 ^{PUN-10}
5	O/TUR/257/2008* (FMDI)	TUR08-AD	639	595	0	93.11	6.89	ME-SA	PanAsia-2 ^{TER-08}
6	O/UKG/35/2001 (AJ539141)	UKG01-35	639	590	0	92.33	7.67	ME-SA	PanAsia
7	O/TUR/264/2009* (FMDI)	TUR09-AK	639	588	0	92.02	7.98	ME-SA	PanAsia-2 ^{SAN-09}
8	O/IRN/88/2009	IRN09-88	639	587	0	91.86	8.14	ME-SA	PanAsia-2 ^{ANT-10}
9	O/KUW/3/97 (DQ164904)	KUW97-03	639	578	0	90.45	9.55	ME-SA	Ind-2001a
10	O/OMN/7/2001 (DQ164941)	OMN01-07	639	571	0	89.36	10.64	ME-SA	Ind-2001b

nt, nucleotides

*, not a WRLFMD reference number

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Report on FMDV O in Turkey in 2014-2015

Batch: WRLFMD/2015/00015

◆ indicates viruses in this batch

Software: MEGA 6.06

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

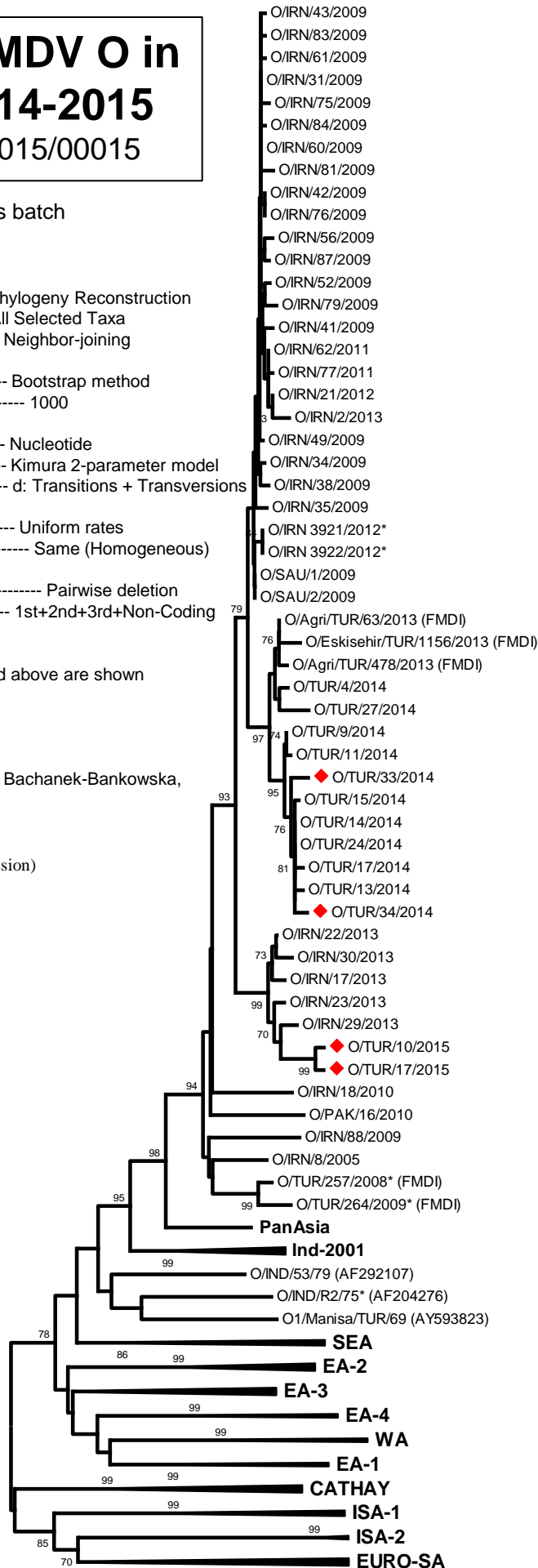
Only bootstrap values of 70% and above are shown

*, not a WRLFMD Ref. No.

N.J. Knowles, J. Wadsworth & K. Bachanek-Bankowska,
25 November 2015

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FAR-09

PanAsia-2

ME-SA

FAR-09?

BAL-09

PUN-10

ANT-10

TER-08

SAN-09

0.02