

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

## Genotyping Report

Report Date for this Batch: 15 September 2014

FMDV type A

Country: Malaysia

Period: 2013

No. of samples: 5

BATCH: WRLFMD/2014/00026



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# FAO World Reference Laboratory for FMD Genotyping Report

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Serotype: A WRLFMD Ref No: MAY/12/2013 Batch No: WRLFMD/2014/00026 Sender Ref: 4874/13 Location: Seberang Jertih, Besut, Terengganu, Malaysia Date collected: 12/10/2013 Date received by WRLFMD: 19/06/2014 Date received for sequencing: 04/09/2014 Species: Cattle Material used: BTy1 29/08/2014 Region sequenced: VP1 RT-PCR primers: A-1C562F/EUR-2B52R A-1C612F/EUR-2B52R	Report date: 14/09/2014 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ASIA Genotype/strain: Sea-97 Sequence filename: MAY13-12.SEQ Date sequence last updated: 12/09/2014 No. of Nt determined: 636 No. of ambiguities: 0 Gene length: 636 Total no. of comparisons: 1991 Min. no. of nt for comparison: 600 Total turn-around time: 87 days Sequencing time: 10 days
Comments:	

<b>Most Closely Related Viruses</b>									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/TAI/13/2013	TAI13-13	633	626	0	98.89	1.11	ASIA	Sea-97
2	A/TAI/22/2013	TAI13-22	633	625	0	98.74	1.26	ASIA	Sea-97
3	A/TAI/3/2012	TAI12-03	636	621	0	97.64	2.36	ASIA	Sea-97
4	A/TAI/4/2012	TAI12-04	636	621	0	97.64	2.36	ASIA	Sea-97
5	A/TAI/9/2012	TAI12-09	636	621	0	97.64	2.36	ASIA	Sea-97
6	A/TAI 3/12* (TRRL)	TAI12-AA	636	621	0	97.64	2.36	ASIA	Sea-97
7	A/TAI 4/12* (TRRL)	TAI12-AB	636	621	0	97.64	2.36	ASIA	Sea-97
8	A/MAY/5/2012	MAY12-05	636	620	0	97.48	2.52	ASIA	Sea-97
9	A/MAY/20/2011	MAY11-20	636	618	0	97.17	2.83	ASIA	Sea-97
10	A/TAI/5/2012	TAI12-05	636	618	0	97.17	2.83	ASIA	Sea-97
<b>Most Closely Related Reference Viruses</b>									
(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/TAI/7/2003 (HQ116312)	TAI03-07	636	596	0	93.71	6.29	ASIA	Sea-97
2	A/TAI/2/97 (EF208778)	TAI97-02	636	577	0	90.72	9.28	ASIA	Sea-97
3	A/TAI/118/87* (EF208777)	TAI87-AD	636	556	0	87.42	12.58	ASIA	Thai-87
4	A22/IRQ/64 (AY593763)	IRQ64--A	636	525	0	82.55	17.45	ASIA	A <sub>22</sub>
5	A/AFG/10/2010	AFG10-10	636	524	0	82.39	17.61	ASIA	Iran-05 <sup>HER-10</sup>
6	A/TUR/33/2008 (FJ755155)	TUR08-33	636	524	0	82.39	17.61	ASIA	Iran-05 <sup>EZM-07</sup>
7	A/TUR/3/2010	TUR10-03	636	523	0	82.23	17.77	ASIA	Iran-05 <sup>KSS-09</sup>
8	A/IRN/1/2005 (EF208769)	IRN05-01	636	522	0	82.08	17.92	ASIA	Iran-05
9	A/TUR/1/2008 (FJ755133)	TUR08-01	636	522	0	82.08	17.92	ASIA	Iran-05 <sup>ARD-07</sup>
10	A/AFG/6/2007 (FJ755007)	AFG07-06	636	521	0	81.92	18.08	ASIA	Iran-05 <sup>AFG-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 WRLFMD Ref No: MAY/17/2013 Batch No: WRLFMD/2014/00026 Sender Ref: 4846/13 Location: Sri Gading, Batu Pahat, Johor, Malaysia Date collected: 05/11/2013 Date received by WRLFMD: 19/06/2014 Date received for sequencing: 11/09/2014 Species: Cattle Material used: BTy1 02/09/2014 Region sequenced: VP1 RT-PCR primers: A-1C562F/EUR-2B52R A-1C612F/EUR-2B52R	Report date: 14/09/2014 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ASIA Genotype/strain: Sea-97 Sequence filename: MAY13-17.SEQ Date sequence last updated: 13/09/2014 No. of Nt determined: 636 No. of ambiguities: 0 Gene length: 636 Total no. of comparisons: 1991 Min. no. of nt for comparison: 600 Total turn-around time: 87 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/MAY/21/2013	MAY13-21	636	633	0	99.53	0.47	ASIA	Sea-97
2	A/MAY/20/2013	MAY13-20	636	632	0	99.37	0.63	ASIA	Sea-97
3	A/TAI/17/2013	TAI13-17	633	629	0	99.37	0.63	ASIA	Sea-97
4	A/TAI/20/2013	TAI13-20	633	629	0	99.37	0.63	ASIA	Sea-97
5	A/VIT/42/2013	VIT13-42	636	631	0	99.21	0.79	ASIA	Sea-97
6	A/VIT/58/2013	VIT13-58	636	631	0	99.21	0.79	ASIA	Sea-97
7	A/VIT/56/2013	VIT13-56	636	630	0	99.06	0.94	ASIA	Sea-97
8	A/LAO/1/2014	LAO14-01	633	627	0	99.05	0.95	ASIA	Sea-97
9	A/LAO/2/2014	LAO14-02	633	627	0	99.05	0.95	ASIA	Sea-97
10	A/LAO/3/2014	LAO14-03	633	627	0	99.05	0.95	ASIA	Sea-97
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/TAI/7/2003 (HQ116312)	TAI03-07	636	588	0	92.45	7.55	ASIA	Sea-97
2	A/TAI/2/97 (EF208778)	TAI97-02	636	570	0	89.62	10.38	ASIA	Sea-97
3	A/TAI/118/87* (EF208777)	TAI87-AD	636	558	0	87.74	12.26	ASIA	Thai-87
4	A22/IRQ/64 (AY593763)	IRQ64--A	636	522	0	82.08	17.92	ASIA	A <sub>22</sub>
5	A/IRN/2/87 (EF208770)	IRN87-02	633	519	0	81.99	18.01	ASIA	Iran-87
6	A/IRN/1/2011	IRN11-01	636	520	0	81.76	18.24	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/GHA/16/73 (KF561698)	GHA73-16	633	515	0	81.36	18.64	AFRICA	G-VI
8	A21/Lumbwa/KEN/64 (AY593761)	KEN64-AA	636	516	0	81.13	18.87	AFRICA	G-III
9	A/IRN/1/96 (EF208771)	IRN96-01	635	515	1	81.10	18.90	ASIA	Iran-96
10	A/IRN/78/2009	IRN09-78	636	515	0	80.97	19.03	ASIA	Iran-05 <sup>FAR-09</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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Serotype: A WRLFMD Ref No: MAY/20/2013 Batch No: WRLFMD/2014/00026 Sender Ref: 5003/13 Location: Kampong Sungai Renek, Besut, Terengganu, Malaysia Date collected: 25/11/2013 Date received by WRLFMD: 19/06/2014 Date received for sequencing: 11/09/2014 Species: Cattle Material used: BTy1 04/09/2014 Region sequenced: VP1 RT-PCR primers: A-1C562F/EUR-2B52R A-1C612F/EUR-2B52R	Report date: 14/09/2014 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ASIA Genotype/strain: Sea-97 Sequence filename: MAY13-20.SEQ Date sequence last updated: 13/09/2014 No. of Nt determined: 636 No. of ambiguities: 0 Gene length: 636 Total no. of comparisons: 1991 Min. no. of nt for comparison: 600 Total turn-around time: 87 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/MAY/21/2013	MAY13-21	636	635	0	99.84	0.16	ASIA	Sea-97
2	A/MAY/17/2013	MAY13-17	636	632	0	99.37	0.63	ASIA	Sea-97
3	A/TAI/17/2013	TAI13-17	633	627	0	99.05	0.95	ASIA	Sea-97
4	A/TAI/20/2013	TAI13-20	633	627	0	99.05	0.95	ASIA	Sea-97
5	A/VIT/42/2013	VIT13-42	636	629	0	98.90	1.10	ASIA	Sea-97
6	A/VIT/58/2013	VIT13-58	636	629	0	98.90	1.10	ASIA	Sea-97
7	A/LAO/1/2014	LAO14-01	633	625	0	98.74	1.26	ASIA	Sea-97
8	A/LAO/2/2014	LAO14-02	633	625	0	98.74	1.26	ASIA	Sea-97
9	A/LAO/3/2014	LAO14-03	633	625	0	98.74	1.26	ASIA	Sea-97
10	A/TAI/21/2013	TAI13-21	633	625	0	98.74	1.26	ASIA	Sea-97
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/TAI/7/2003 (HQ116312)	TAI03-07	636	586	0	92.14	7.86	ASIA	Sea-97
2	A/TAI/2/97 (EF208778)	TAI97-02	636	568	0	89.31	10.69	ASIA	Sea-97
3	A/TAI/118/87* (EF208777)	TAI87-AD	636	554	0	87.11	12.89	ASIA	Thai-87
4	A22/IRQ/64 (AY593763)	IRQ64--A	636	521	0	81.92	18.08	ASIA	A <sub>22</sub>
5	A/IRN/2/87 (EF208770)	IRN87-02	633	518	0	81.83	18.17	ASIA	Iran-87
6	A/IRN/1/2011	IRN11-01	636	519	0	81.60	18.40	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/GHA/16/73 (KF561698)	GHA73-16	633	515	0	81.36	18.64	AFRICA	G-VI
8	A/IRN/1/96 (EF208771)	IRN96-01	635	516	1	81.26	18.74	ASIA	Iran-96
9	A21/Lumbwa/KEN/64 (AY593761)	KEN64-AA	636	516	0	81.13	18.87	AFRICA	G-III
10	A/IRN/15/2012	IRN12-15	636	515	0	80.97	19.03	ASIA	Iran-05 <sup>SIS-12</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: 14/09/2014
WRLFMD Ref No: MAY/21/2013	Reported by: N.J. Knowles
Batch No: WRLFMD/2014/00026	Checked by: K. Bachanek-Bankowska
Sender Ref: 5007/13	
Location: Kampong Padang Lengkuas, Besut, Terengganu, Malaysia	Topotype: ASIA
Date collected: 25/11/2013	Genotype/strain: Sea-97
Date received by WRLFMD: 19/06/2014	Sequence filename: MAY13-21.SEQ
Date received for sequencing: 11/09/2014	Date sequence last updated: 13/09/2014
Species: Cattle	No. of Nt determined: 636
Material used: BTy1 04/09/2014	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 636
RT-PCR primers: A-1C562F/EUR-2B52R A-1C612F/EUR-2B52R	Total no. of comparisons: 1991
	Min. no. of nt for comparison: 600
	Total turn-around time: 87 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/MAY/20/2013	MAY13-20	636	635	0	99.84	0.16	ASIA	Sea-97
2	A/MAY/17/2013	MAY13-17	636	633	0	99.53	0.47	ASIA	Sea-97
3	A/TAI/17/2013	TAI13-17	633	628	0	99.21	0.79	ASIA	Sea-97
4	A/TAI/20/2013	TAI13-20	633	628	0	99.21	0.79	ASIA	Sea-97
5	A/VIT/42/2013	VIT13-42	636	630	0	99.06	0.94	ASIA	Sea-97
6	A/VIT/58/2013	VIT13-58	636	630	0	99.06	0.94	ASIA	Sea-97
7	A/VIT/56/2013	VIT13-56	636	629	0	98.90	1.10	ASIA	Sea-97
8	A/LAO/1/2014	LAO14-01	633	626	0	98.89	1.11	ASIA	Sea-97
9	A/LAO/2/2014	LAO14-02	633	626	0	98.89	1.11	ASIA	Sea-97
10	A/LAO/3/2014	LAO14-03	633	626	0	98.89	1.11	ASIA	Sea-97
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/TAI/7/2003 (HQ116312)	TAI03-07	636	587	0	92.30	7.70	ASIA	Sea-97
2	A/TAI/2/97 (EF208778)	TAI97-02	636	569	0	89.47	10.53	ASIA	Sea-97
3	A/TAI/118/87* (EF208777)	TAI87-AD	636	555	0	87.26	12.74	ASIA	Thai-87
4	A22/IRQ/64 (AY593763)	IRQ64--A	636	522	0	82.08	17.92	ASIA	A <sub>22</sub>
5	A/IRN/2/87 (EF208770)	IRN87-02	633	519	0	81.99	18.01	ASIA	Iran-87
6	A/IRN/1/2011	IRN11-01	636	520	0	81.76	18.24	ASIA	Iran-05 <sup>FAR-11</sup>
7	A/IRN/1/96 (EF208771)	IRN96-01	635	517	1	81.42	18.58	ASIA	Iran-96
8	A/GHA/16/73 (KF561698)	GHA73-16	633	514	0	81.20	18.80	AFRICA	G-VI
9	A/IRN/15/2012	IRN12-15	636	516	0	81.13	18.87	ASIA	Iran-05 <sup>SIS-12</sup>
10	A/UGA/13/66 (KF561705)	UGA66-13	636	516	0	81.13	18.87	AFRICA	G-VII

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 WRLFMD Ref No: MAY/23/2013 Batch No: WRLFMD/2014/00026 Sender Ref: 08/14 Location: Felda Air Hitam, Kluang, Johor, Malaysia Date collected: 26/12/2013 Date received by WRLFMD: 19/06/2014 Date received for sequencing: 11/09/2014 Species: Cattle Material used: BTy1 05/09/2014 Region sequenced: VP1 RT-PCR primers: A-1C562F/EUR-2B52R A-1C612F/EUR-2B52R	Report date: 14/09/2014 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska Topotype: ASIA Genotype/strain: Sea-97 Sequence filename: MAY13-23.SEQ Date sequence last updated: 13/09/2014 No. of Nt determined: 636 No. of ambiguities: 0 Gene length: 636 Total no. of comparisons: 1991 Min. no. of nt for comparison: 600 Total turn-around time: 87 days Sequencing time: 3 days
Comments:	

<b>Most Closely Related Viruses</b>									
Pos.	Virus name	Filename	No. nt comp.	No. nt match.	No. of ambig.	% Id.	% Diff.	Topotype	Strain
1	A/TAI/1/2012	TAI12-01	636	606	0	95.28	4.72	ASIA	Sea-97
2	A/TAI/2/2012	TAI12-02	636	606	0	95.28	4.72	ASIA	Sea-97
3	A/MAY/3/2012	MAY12-03	636	605	0	95.13	4.87	ASIA	Sea-97
4	A/TAI/1/2011	TAI11-01	636	605	0	95.13	4.87	ASIA	Sea-97
5	A/MAY/4/2012	MAY12-04	636	604	0	94.97	5.03	ASIA	Sea-97
6	A/TAI/16/2012	TAI12-16	636	603	0	94.81	5.19	ASIA	Sea-97
7	A/TAI/8/2010	TAI10-08	636	602	0	94.65	5.35	ASIA	Sea-97
8	A/TAI/9/2011	TAI11-09	636	602	0	94.65	5.35	ASIA	Sea-97
9	A/THA 66-1/10* (TRRL)	TAI10-AA	636	602	0	94.65	5.35	ASIA	Sea-97
10	A/THA 69-6/10* (TRRL)	TAI10-AC	636	602	0	94.65	5.35	ASIA	Sea-97
<b>Most Closely Related Reference Viruses</b>									
(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/TAI/7/2003 (HQ116312)	TAI03-07	636	582	0	91.51	8.49	ASIA	Sea-97
2	A/TAI/2/97 (EF208778)	TAI97-02	636	562	0	88.36	11.64	ASIA	Sea-97
3	A/TAI/118/87* (EF208777)	TAI87-AD	636	549	0	86.32	13.68	ASIA	Thai-87
4	A22/IRQ/64 (AY593763)	IRQ64--A	636	521	0	81.92	18.08	ASIA	A <sub>22</sub>
5	A/IRN/1/96 (EF208771)	IRN96-01	635	519	1	81.73	18.27	ASIA	Iran-96
6	A/IRN/78/2009	IRN09-78	636	518	0	81.45	18.55	ASIA	Iran-05 <sup>FAR-09</sup>
7	A/IRN/2/87 (EF208770)	IRN87-02	633	512	0	80.88	19.12	ASIA	Iran-87
8	A/AFG/10/2010	AFG10-10	636	514	0	80.82	19.18	ASIA	Iran-05 <sup>HER-10</sup>
9	A/BAR/6/2008 (FJ755010)	BAR08-06	636	514	0	80.82	19.18	ASIA	Iran-05 <sup>BAR-08</sup>
10	A/TUR/1/2008 (FJ755133)	TUR08-01	636	514	0	80.82	19.18	ASIA	Iran-05 <sup>ARD-07</sup>

nt, nucleotides

\*, not a WRLFMD reference number

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# Report on FMDV A in Malaysia in 2013

Batch: WRLFMD/2014/00026

◆ 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 : 639

No Of Bootstrap Reps = 1000

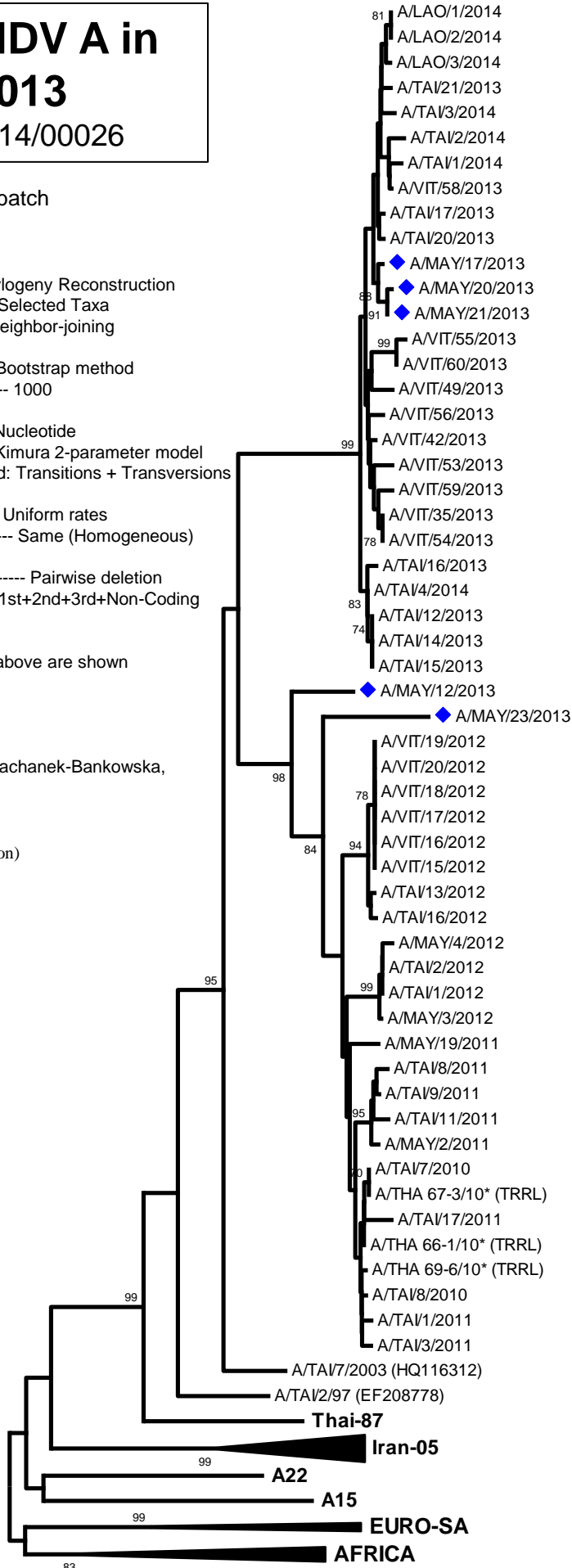
Only bootstrap values of 70% and above are shown

\*, not a WRLFMD Ref. No.

N.J. Knowles, J. Wadsworth & K. Bachanek-Bankowska,  
14 September 2014

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0.02