

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

## Genotyping Report

Report Date for this Batch: 18 April 2016

FMDV type A

Country: Sudan

Period: 2013

No. of samples: 5

BATCH: WRLFMD/2015/00038



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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: 12/04/2016
WRLFMD Ref No: SUD/1/2013	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00038	Checked by: K. Bachanek-Bankowska
Sender Ref: Feb/2013-Kh 1/4	
Location: not known, Sudan	Topotype: AFRICA
Date collected: 19/02/2013	Genotype/strain: G-IV
Date received by WRLFMD: 03/12/2015	Sequence filename: SUD13-01.SEQ
Date received for sequencing: 18/03/2016	Date sequence last updated: 12/04/2016
Species: Cattle	No. of Nt determined: 639
Material used: BTy1 09/03/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2128
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 131 days
	Sequencing time: 25 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/SUD/3/2006 (GU566070)	SUD06-03	639	604	0	94.52	5.48	AFRICA	G-IV
2	A/ERI/1/2008	ERI08-01	639	603	0	94.37	5.63	AFRICA	G-IV
3	A/ERI/16/2009	ERI09-16	639	603	0	94.37	5.63	AFRICA	G-IV
4	A/ERI/4/2007	ERI07-04	639	603	0	94.37	5.63	AFRICA	G-IV
5	A/ERI/5/2006	ERI06-05	639	602	0	94.21	5.79	AFRICA	G-IV
6	A/SUD/1/2006 (GU566069)	SUD06-01	639	602	0	94.21	5.79	AFRICA	G-IV
7	A/ERI/5/2008	ERI08-05	639	601	0	94.05	5.95	AFRICA	G-IV
8	A/ERI/1/2006	ERI06-01	639	600	0	93.90	6.10	AFRICA	G-IV
9	A/ERI/40/2009	ERI09-40	639	596	0	93.27	6.73	AFRICA	G-IV
10	A/SUD/10/2013	SUD13-10	639	595	0	93.11	6.89	AFRICA	G-IV
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	A21/Lumbwa/KEN/64 (AY593761)	KEN64-AA	639	539	0	84.35	15.65	AFRICA	G-III
2	A/SUD/3/77 (GU566064)	SUD77-03	639	538	0	84.19	15.81	AFRICA	G-IV
3	A/EGY/1/72 (EF208756)	EGY72-01	639	530	0	82.94	17.06	AFRICA	G-II
4	A/GHA/16/73 (KF561698)	GHA73-16	636	527	0	82.86	17.14	AFRICA	G-VI
5	A/KEN/42/66 (K18/66)(KF561699)	KEN66-42	639	529	0	82.79	17.21	AFRICA	G-I
6	A/NGR/2/73 (KF561704)	NGR73-02	639	529	0	82.79	17.21	AFRICA	G-V
7	A/UGA/13/66 (KF561705)	UGA66-13	639	527	0	82.47	17.53	AFRICA	G-VII
8	A12/UK/119/32 (M10975)	UKG32119	639	515	0	80.59	19.41	EURO-SA	A <sub>12</sub>
9	A/Alem/ARG/81 (AJ306219)	ARG81--A	639	514	0	80.44	19.56	EURO-SA	A-81
10	A5/Allier/FRA/60 (AY593780)	FRA60--F	636	509	0	80.03	19.97	EURO-SA	A <sub>5</sub>

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 WRLFMD Ref No: SUD/10/2013 Batch No: WRLFMD/2015/00038 Sender Ref: Gez 3 Location: not known, Sudan Date collected: 31/12/2013 Date received by WRLFMD: 03/12/2015 Date received for sequencing: 05/04/2016 Species: Cattle Material used: BTy1 12/03/2016 & BTy2 15/03/2016 Region sequenced: VP1 RT-PCR primers: A-1C562F/EUR-2B52R A-1C612F/EUR-2B52R	Report date: 06/04/2016 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska  Topotype: AFRICA Genotype/strain: G-IV Sequence filename: SUD13-10.SEQ Date sequence last updated: 06/04/2016 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 2128 Min. no. of nt for comparison: 600 Total turn-around time: 125 days Sequencing time: 1 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/SUD/11/2013	SUD13-11	639	639	0	100.00	0.00	AFRICA	G-IV
2	A/SUD/12/2013	SUD13-12	639	638	0	99.84	0.16	AFRICA	G-IV
3	A/SUD/13/2013	SUD13-13	639	638	0	99.84	0.16	AFRICA	G-IV
4	A/ERI/1/2006	ERI06-01	639	606	0	94.84	5.16	AFRICA	G-IV
5	A/SUD/3/2006 (GU566070)	SUD06-03	639	606	0	94.84	5.16	AFRICA	G-IV
6	A/ERI/1/2008	ERI08-01	639	605	0	94.68	5.32	AFRICA	G-IV
7	A/ERI/16/2009	ERI09-16	639	605	0	94.68	5.32	AFRICA	G-IV
8	A/ERI/4/2007	ERI07-04	639	605	0	94.68	5.32	AFRICA	G-IV
9	A/ERI/5/2008	ERI08-05	639	605	0	94.68	5.32	AFRICA	G-IV
10	A/ERI/5/2006	ERI06-05	639	604	0	94.52	5.48	AFRICA	G-IV
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/SUD/3/77 (GU566064)	SUD77-03	639	544	0	85.13	14.87	AFRICA	G-IV
2	A21/Lumbwa/KEN/64 (AY593761)	KEN64-AA	639	536	0	83.88	16.12	AFRICA	G-III
3	A/KEN/42/66 (K18/66)(KF561699)	KEN66-42	639	532	0	83.26	16.74	AFRICA	G-I
4	A/NGR/2/73 (KF561704)	NGR73-02	639	532	0	83.26	16.74	AFRICA	G-V
5	A/GHA/16/73 (KF561698)	GHA73-16	636	529	0	83.18	16.82	AFRICA	G-VI
6	A/UGA/13/66 (KF561705)	UGA66-13	639	523	0	81.85	18.15	AFRICA	G-VII
7	A12/UK/119/32 (M10975)	UKG32119	639	522	0	81.69	18.31	EURO-SA	A <sub>12</sub>
8	A/EGY/1/72 (EF208756)	EGY72-01	639	515	0	80.59	19.41	AFRICA	G-II
9	A/Alem/ARG/81 (AJ306219)	ARG81--A	639	514	0	80.44	19.56	EURO-SA	A-81
10	A/IRN/2/87 (EF208770)	IRN87-02	636	508	0	79.87	20.13	ASIA	Iran-87

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: 06/04/2016
WRLFMD Ref No: SUD/11/2013	Reported by: N.J. Knowles
Batch No: WRLFMD/2015/00038	Checked by: K. Bachanek-Bankowska
Sender Ref: Gez 5	
Location: not known, Sudan	Topotype: AFRICA
Date collected: 31/12/2013	Genotype/strain: G-IV
Date received by WRLFMD: 03/12/2015	Sequence filename: SUD13-11.SEQ
Date received for sequencing: 18/03/2016	Date sequence last updated: 06/04/2016
Species: Cattle	No. of Nt determined: 639
Material used: BTy1 12/03/2016	No. of ambiguities: 0
Region sequenced: VP1	Gene length: 639
RT-PCR primers: A-1C562F/EUR-2B52R	Total no. of comparisons: 2128
A-1C612F/EUR-2B52R	Min. no. of nt for comparison: 600
	Total turn-around time: 125 days
	Sequencing time: 19 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/SUD/10/2013	SUD13-10	639	639	0	100.00	0.00	AFRICA	G-IV
2	A/SUD/12/2013	SUD13-12	639	638	0	99.84	0.16	AFRICA	G-IV
3	A/SUD/13/2013	SUD13-13	639	638	0	99.84	0.16	AFRICA	G-IV
4	A/ERI/1/2006	ERI06-01	639	606	0	94.84	5.16	AFRICA	G-IV
5	A/SUD/3/2006 (GU566070)	SUD06-03	639	606	0	94.84	5.16	AFRICA	G-IV
6	A/ERI/1/2008	ERI08-01	639	605	0	94.68	5.32	AFRICA	G-IV
7	A/ERI/16/2009	ERI09-16	639	605	0	94.68	5.32	AFRICA	G-IV
8	A/ERI/4/2007	ERI07-04	639	605	0	94.68	5.32	AFRICA	G-IV
9	A/ERI/5/2008	ERI08-05	639	605	0	94.68	5.32	AFRICA	G-IV
10	A/ERI/5/2006	ERI06-05	639	604	0	94.52	5.48	AFRICA	G-IV
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/SUD/3/77 (GU566064)	SUD77-03	639	544	0	85.13	14.87	AFRICA	G-IV
2	A21/Lumbwa/KEN/64 (AY593761)	KEN64-AA	639	536	0	83.88	16.12	AFRICA	G-III
3	A/KEN/42/66 (K18/66)(KF561699)	KEN66-42	639	532	0	83.26	16.74	AFRICA	G-I
4	A/NGR/2/73 (KF561704)	NGR73-02	639	532	0	83.26	16.74	AFRICA	G-V
5	A/GHA/16/73 (KF561698)	GHA73-16	636	529	0	83.18	16.82	AFRICA	G-VI
6	A/UGA/13/66 (KF561705)	UGA66-13	639	523	0	81.85	18.15	AFRICA	G-VII
7	A12/UK/119/32 (M10975)	UKG32119	639	522	0	81.69	18.31	EURO-SA	A <sub>12</sub>
8	A/EGY/1/72 (EF208756)	EGY72-01	639	515	0	80.59	19.41	AFRICA	G-II
9	A/Alem/ARG/81 (AJ306219)	ARG81--A	639	514	0	80.44	19.56	EURO-SA	A-81
10	A/IRN/2/87 (EF208770)	IRN87-02	636	508	0	79.87	20.13	ASIA	Iran-87

nt, nucleotides

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Serotype: A WRLFMD Ref No: SUD/12/2013 Batch No: WRLFMD/2015/00038 Sender Ref: Gez 7 Location: not given, Sudan Date collected: 31/12/2013 Date received by WRLFMD: 03/12/2015 Date received for sequencing: 05/04/2016 Species: Cattle Material used: BTy1 12/03/2016 & BTy2 22/03/2016 Region sequenced: VP1 RT-PCR primers: A-1C562F/EUR-2B52R A-1C612F/EUR-2B52R	Report date: 06/04/2016 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska  Topotype: AFRICA Genotype/strain: G-IV Sequence filename: SUD13-12.SEQ Date sequence last updated: 06/04/2016 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 2128 Min. no. of nt for comparison: 600 Total turn-around time: 125 days Sequencing time: 1 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/SUD/13/2013	SUD13-13	639	639	0	100.00	0.00	AFRICA	G-IV
2	A/SUD/10/2013	SUD13-10	639	638	0	99.84	0.16	AFRICA	G-IV
3	A/SUD/11/2013	SUD13-11	639	638	0	99.84	0.16	AFRICA	G-IV
4	A/ERI/1/2006	ERI06-01	639	606	0	94.84	5.16	AFRICA	G-IV
5	A/SUD/3/2006 (GU566070)	SUD06-03	639	606	0	94.84	5.16	AFRICA	G-IV
6	A/ERI/1/2008	ERI08-01	639	605	0	94.68	5.32	AFRICA	G-IV
7	A/ERI/16/2009	ERI09-16	639	605	0	94.68	5.32	AFRICA	G-IV
8	A/ERI/4/2007	ERI07-04	639	605	0	94.68	5.32	AFRICA	G-IV
9	A/ERI/5/2008	ERI08-05	639	605	0	94.68	5.32	AFRICA	G-IV
10	A/ERI/5/2006	ERI06-05	639	604	0	94.52	5.48	AFRICA	G-IV
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/SUD/3/77 (GU566064)	SUD77-03	639	545	0	85.29	14.71	AFRICA	G-IV
2	A21/Lumbwa/KEN/64 (AY593761)	KEN64-AA	639	537	0	84.04	15.96	AFRICA	G-III
3	A/GHA/16/73 (KF561698)	GHA73-16	636	530	0	83.33	16.67	AFRICA	G-VI
4	A/KEN/42/66 (K18/66)(KF561699)	KEN66-42	639	531	0	83.10	16.90	AFRICA	G-I
5	A/NGR/2/73 (KF561704)	NGR73-02	639	531	0	83.10	16.90	AFRICA	G-V
6	A/UGA/13/66 (KF561705)	UGA66-13	639	522	0	81.69	18.31	AFRICA	G-VII
7	A12/UK/119/32 (M10975)	UKG32119	639	521	0	81.53	18.47	EURO-SA	A <sub>12</sub>
8	A/EGY/1/72 (EF208756)	EGY72-01	639	516	0	80.75	19.25	AFRICA	G-II
9	A/Alem/ARG/81 (AJ306219)	ARG81--A	639	515	0	80.59	19.41	EURO-SA	A-81
10	A/IRN/2/87 (EF208770)	IRN87-02	636	507	0	79.72	20.28	ASIA	Iran-87

nt, nucleotides

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Serotype: A WRLFMD Ref No: SUD/13/2013 Batch No: WRLFMD/2015/00038 Sender Ref: Gez 9 Location: not known, Sudan Date collected: 31/12/2013 Date received by WRLFMD: 03/12/2015 Date received for sequencing: 05/04/2016 Species: Cattle Material used: BTy1 13/03/2016 & BTy2 15/03/2016 Region sequenced: VP1 RT-PCR primers: A-1C562F/EUR-2B52R A-1C612F/EUR-2B52R	Report date: 06/04/2016 Reported by: N.J. Knowles Checked by: K. Bachanek-Bankowska  Topotype: AFRICA Genotype/strain: G-IV Sequence filename: SUD13-13.SEQ Date sequence last updated: 06/04/2016 No. of Nt determined: 639 No. of ambiguities: 0 Gene length: 639 Total no. of comparisons: 2128 Min. no. of nt for comparison: 600 Total turn-around time: 125 days Sequencing time: 1 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/SUD/12/2013	SUD13-12	639	639	0	100.00	0.00	AFRICA	G-IV
2	A/SUD/10/2013	SUD13-10	639	638	0	99.84	0.16	AFRICA	G-IV
3	A/SUD/11/2013	SUD13-11	639	638	0	99.84	0.16	AFRICA	G-IV
4	A/ERI/1/2006	ERI06-01	639	606	0	94.84	5.16	AFRICA	G-IV
5	A/SUD/3/2006 (GU566070)	SUD06-03	639	606	0	94.84	5.16	AFRICA	G-IV
6	A/ERI/1/2008	ERI08-01	639	605	0	94.68	5.32	AFRICA	G-IV
7	A/ERI/16/2009	ERI09-16	639	605	0	94.68	5.32	AFRICA	G-IV
8	A/ERI/4/2007	ERI07-04	639	605	0	94.68	5.32	AFRICA	G-IV
9	A/ERI/5/2008	ERI08-05	639	605	0	94.68	5.32	AFRICA	G-IV
10	A/ERI/5/2006	ERI06-05	639	604	0	94.52	5.48	AFRICA	G-IV
<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/SUD/3/77 (GU566064)	SUD77-03	639	545	0	85.29	14.71	AFRICA	G-IV
2	A21/Lumbwa/KEN/64 (AY593761)	KEN64-AA	639	537	0	84.04	15.96	AFRICA	G-III
3	A/GHA/16/73 (KF561698)	GHA73-16	636	530	0	83.33	16.67	AFRICA	G-VI
4	A/KEN/42/66 (K18/66)(KF561699)	KEN66-42	639	531	0	83.10	16.90	AFRICA	G-I
5	A/NGR/2/73 (KF561704)	NGR73-02	639	531	0	83.10	16.90	AFRICA	G-V
6	A/UGA/13/66 (KF561705)	UGA66-13	639	522	0	81.69	18.31	AFRICA	G-VII
7	A12/UK/119/32 (M10975)	UKG32119	639	521	0	81.53	18.47	EURO-SA	A <sub>12</sub>
8	A/EGY/1/72 (EF208756)	EGY72-01	639	516	0	80.75	19.25	AFRICA	G-II
9	A/Alem/ARG/81 (AJ306219)	ARG81--A	639	515	0	80.59	19.41	EURO-SA	A-81
10	A/IRN/2/87 (EF208770)	IRN87-02	636	507	0	79.72	20.28	ASIA	Iran-87

nt, nucleotides

\*, not a WRLFMD reference number

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# Report on FMDV A in Sudan in 2013

Batch: WRLFMD/2016/00038

◆ indicates viruses in this batch

Software: MEGA 6.06

Analysis

----- Phylogeny Reconstruction

----- All Selected Taxa

----- Neighbor-joining

Phylogeny Test

----- Bootstrap method

----- 1000

Substitution Model

----- Nucleotide

----- Kimura 2-parameter model

----- d: Transitions + Transversions

Rates and Patterns

----- Uniform rates

----- Same (Homogeneous)

Data Subset to Use

----- Pairwise deletion

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

No. of Sites : 639

No Of Bootstrap Reps = 1000

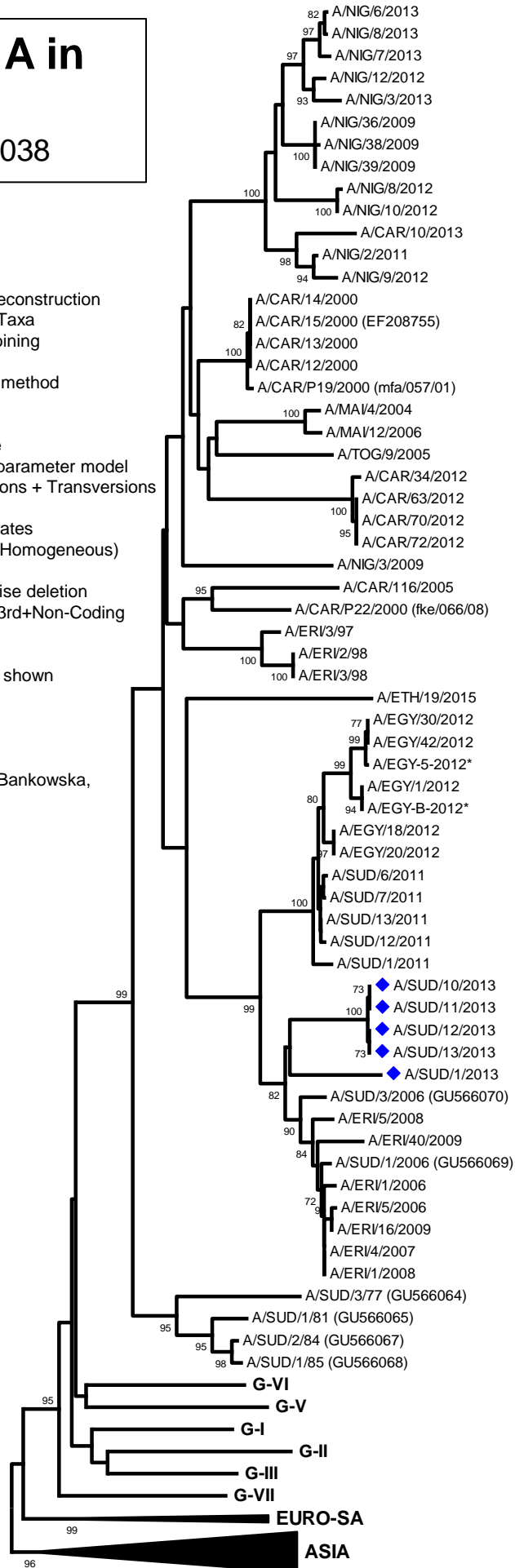
Only bootstrap values of 70% and above are shown

\*, not a WRLFMD Ref. No.

N.J. Knowles, J. Wadsworth & K. Bachanek-Bankowska,  
18 April 2016

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G-IV

AFRICA

0.02