WRLFMD

eufmd
European Commission for the Control of Foot-and-Mouth disease

OIE/FAO Foot-and-Mouth Disease Reference Laboratories Network

Foot-and-Mouth Disease

2023

Quarterly report

July–September

This report is version 1

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Jammu and Kashmir: *Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.*

Sudan and South Sudan: *Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined.*

Abyei: *Final status of the Abyei area is not yet determined.*

Falkland Islands (Malvinas): *A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).*

Contents

Abbreviations and acronyms

BVI	Botswana Vaccine Institute
EIDRA	Emerging Infectious Disease Research Association
EuFMD	European Commission for the Control of Foot-and-Mouth Disease
FAST reports	foot-and-mouth and similar transboundary animal diseases reports
FGBI “ARRIAH”	Federal Governmental Budgetary Institution “Federal Centre for Animal Health”
FMD	foot-and-mouth disease
FMDV	foot-and-mouth disease virus
FMDV GD	foot-and-mouth disease virus genome detected
FMDV NGD	foot-and-mouth disease virus genome not detected
GF-TAD	Global Framework for the Progressive Control of Transboundary Animal Diseases
LVRI	Lanzhou Veterinary Research Institute
MEVAC	International Facility for Veterinary Vaccines Production (Egypt)
MNFMDL	Malaysian National Foot-and-Mouth Disease Laboratory
NT	not tested
NVD	no virus detected
PIADC	Plum Island Animal Disease Center
Pusvetma	Pusat Veteriner Farma (Indonesia)
rRT-PCR	real-time reverse transcription polymerase chain reaction
SAARC	South Asian Association for Regional Cooperation
SADC	Southern African Development Community
SAT	Southern African Territories
SEACFMD	South-East Asia and China FMD campaign
SSARRL	Sub-Saharan Africa Regional Reference Laboratory
SVD	swine vesicular disease
VETBIS	Veterinary Information System of Türkiye
VI	virus isolation
WAHIS	World Animal Health Information System (of the WOAH)
WOAH	World Organisation for Animal Health
WRLFMD	World Reference Laboratory for Foot-and-Mouth Disease

1. Highlights and headlines

Welcome to this quarterly report that describes recent data for foot-and-mouth disease (FMD) outbreaks. During this period, the WRLFMD has reported test results for samples received from Bahrain, Nepal, Nigeria, Qatar, Republic of Korea and Thailand. There have also been new sequence submissions from Ethiopia (BVI, Botswana), Malawi (BVI, Botswana) and Palestine (Kimron Veterinary Institute [Israel]).

Data presented at the recent WOAH/FAO Reference Laboratory Network meeting show that FMD cases due to the emerging SAT2/XIV topotype continue to be reported in Türkiye. SAT2/XIV outbreaks in Anatolia (n=127) comprise new cases detected in western provinces including Kütahya, Isparta and Afyonkarahisar. Elsewhere, serological data for samples collected in Bahrain suggests that SAT2/XIV infection in cattle is more widespread than might be indicated from clinical signs; findings that may help understand the potential for long term maintenance of this lineage in the Near East. The FAO has recently published a risk assessment to help countries prepare for the possible spread of the SAT2/XIV topotype into other countries (https://www.fao.org/documents/card/en/c/cc8173en).

The complexity of FMDV circulation in the Gulf States has been highlighted by the unexpected detection of the SAT1/I topotype in Qatar (samples collected during April 2023, described in this report). This virus shares closest sequence identity to a virus from Kenya, further reinforcing the epidemiological connections between East Africa and the Gulf States. Although the FMD viruses detected in Qatar are distinct (with >10 percent nucleotide difference) to those recovered from SAT1/I outbreaks reported in the Comoros earlier in the year, the concurrence of these outbreaks may reflect a general upsurge in SAT 1 in East Africa. At the same time as the SAT2/XIV and SAT1/I outbreaks have been occurring, FMD cases due to the O/ME-SA/PanAsia-2^{ANT-10} lineage have been detected in Israel and Palestine. These events reinforce the importance of the work undertaken by FMD Reference Laboratories to understand global events and recognise new risks. The WOAH/FAO FMD Laboratory Network encourages countries to submit clinical samples for laboratory analyses where testing is free-of-charge; for further information or assistance with shipments, contact donald.king@pirbright.ac.uk.

I take this opportunity to welcome Dr Dónal Sammin as the new Executive Secretary of the European Commission for the control of Foot-and-Mouth Disease (EuFMD) and look forward to working closely with him in the coming months.

Don King, Pirbright, October 2023

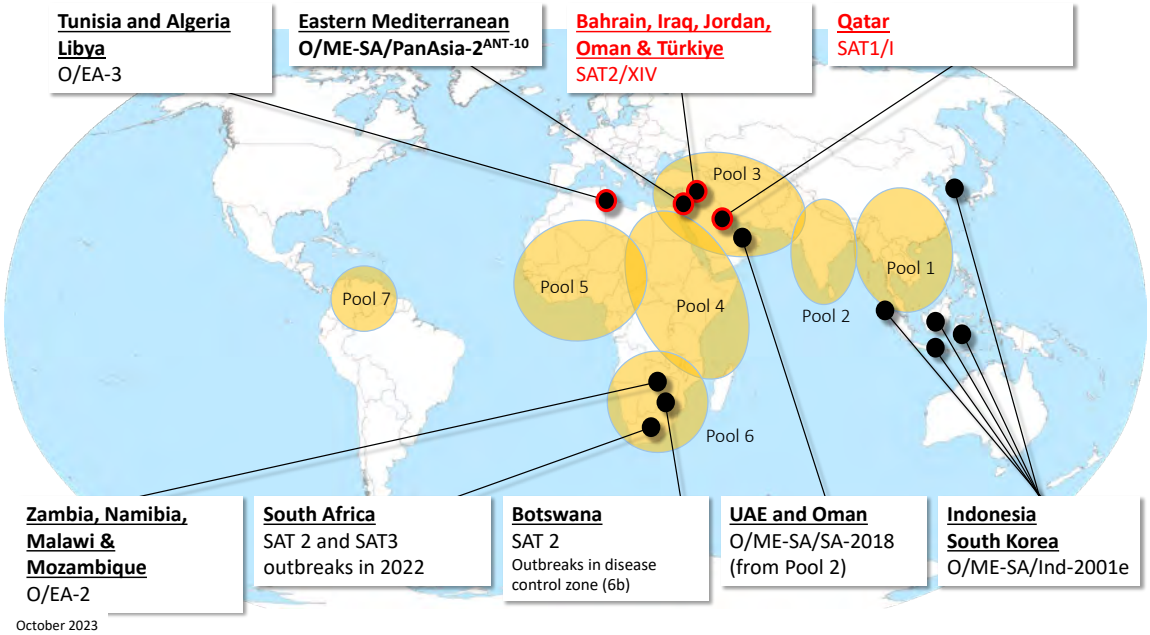


Figure 1: Recent FMD global outbreaks

Note: New headline events reported July to September 2023 are highlighted in red with endemic pools highlighted in orange.
Source: WRLFMD. Map conforms to the United Nations World Map, June 2020.

2. General overview

Endemic Pools comprise separate ecosystems that maintain independently circulating and evolving foot-and-mouth disease virus (FMDV) genotypes. In the absence of specific reports, it should be assumed that the serotypes indicated below are continuously circulating in parts of the pool area and would be detected if sufficient surveillance was in place.

POOL	REGION/COUNTRIES	SEROTYPES PRESENT
1	**SOUTHEAST ASIA/CENTRAL ASIA/EAST ASIA** Cambodia, China, China (Hong Kong SAR), Taiwan Province of China, Indonesia, Democratic People's Republic of Korea, Republic of Korea, Lao People's Democratic Republic, Malaysia, Mongolia, Myanmar, Russian Federation, Thailand, Viet Nam	A, Asia1 and O
2	**SOUTH ASIA** Bangladesh, Bhutan, India, Mauritius[1], Nepal, Sri Lanka	A, Asia1 and O
3	**WEST EURASIA & NEAR EAST** Afghanistan, Armenia, Azerbaijan, Bahrain, Georgia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Syrian Arab Republic, Tajikistan, Türkiye, Turkmenistan, United Arab Emirates, Uzbekistan	A, Asia1 and O (SAT2)
4	**EASTERN AFRICA** Burundi, Comoros, Djibouti, Egypt[3], Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, Uganda, United Republic of Tanzania, Yemen	O, A, SAT1, SAT2 and SAT3
	NORTH AFRICA[2] Algeria, Libya, Morocco, Tunisia	A and O
5	**WEST/CENTRAL AFRICA** Benin, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Togo	O, A, SAT1 and SAT2
6	**SOUTHERN AFRICA** Angola, Botswana, Malawi, Mozambique, Namibia, South Africa, Zambia, Zimbabwe	SAT1, SAT2 and SAT3 (O[4], A)
7	**SOUTH AMERICA** Venezuela (Bolivarian Republic of)	O and A

[1]FMD outbreaks in 2016/21 due to O/ME-SA/Ind-2001 demonstrate close epidemiological links between Pool 2 and Mauritius.

[2]Long-term maintenance of FMDV lineages has not been documented in the Maghreb countries of North Africa and therefore this region does not constitute an Endemic Pool, but data is segregated here since FMD circulation in this region poses a specific risk to FMD-free countries in Southern Europe.

[3]Egypt represents a crossroads between East African Pool 4 and the Near East (Pool 3). NB: Serotypes SAT1 and SAT3 have not been detected in this country.

[4]Detection of O/EA-2 in southern/western Zambia (2018–2021), Namibia (2021), Malawi (2022) and Mozambique (2022) represent a new incursion into Pool 6.

3. Summary of FMD outbreaks and intelligence

3.1. Overview of reports

The location of information provided in this report can be seen on the map below. More detailed maps and sample data, on a country-by-country basis, can be found in the following sections of this report.

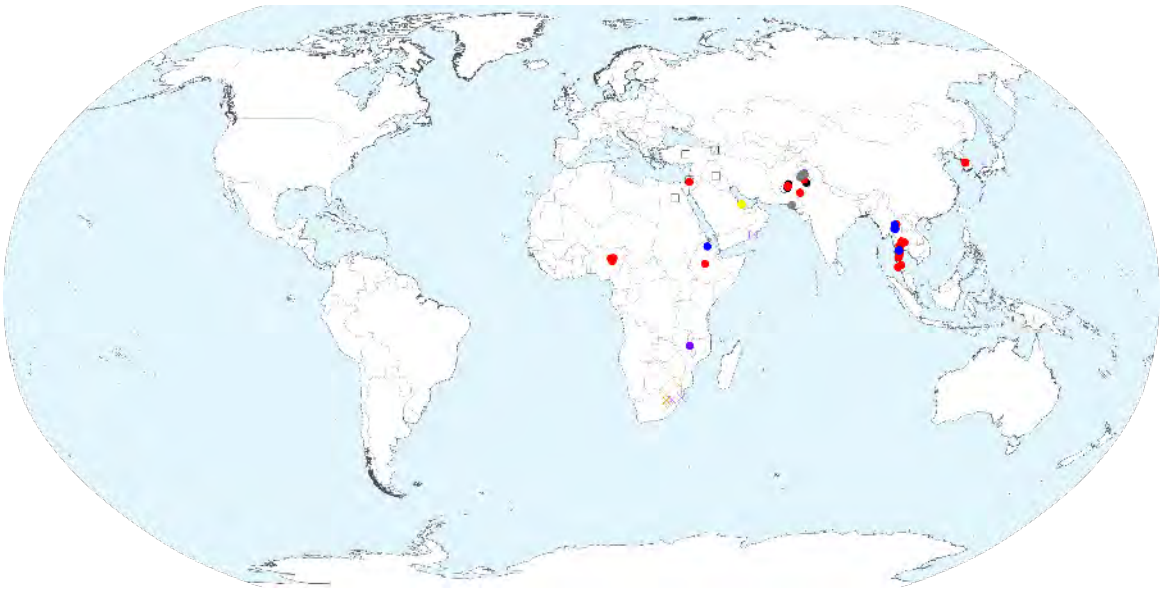


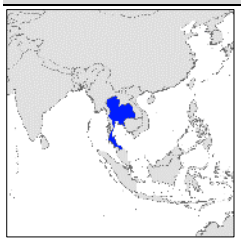
Figure 1: Samples tested by WRLFMD or reported in this quarter. ● indicates samples analysed; × indicates outbreaks reported/updated to the WOAH this quarter; □ indicates reports of FMD from other sources. Shape colours define the serotype detected ●O; ●A; ●C; ●Asia1, ●SAT1, ●SAT2, ●SAT3, ○ FMD not detected, ● serotype undetermined/not given in the report.

Source: WRLFMD. Map conforms to the United Nations World map, June 2020.

3.2. Pool 1 (Southeast Asia/Central Asia/East Asia)

Republic of Korea	
	On 18 July 2023, a single sample was received from the Animal and Plant Quarantine Agency. It was collected from cattle sampled in Chungcheongbuk-do on 14 May 2023. It was identified as **FMD type O** and genotyping revealed it to belong to the O/ME-SA/Ind-2001e sublineage (see below).

The Kingdom of Thailand



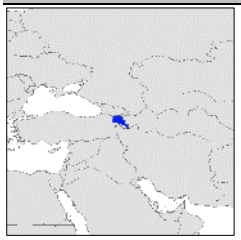
On 16 August 2023, a batch of 24 samples (cell culture passaged isolates) were received. They were collected from cattle in various regions between November 2021 and January 2023. They were identified as **FMD type O** (n=17) or **FMD type A** (n=7). Genotyping revealed that 16 of the type O viruses belonged to the ME-SA/Ind-2001e sublineage, while one was closely related to the 1987 Thai vaccine strain; all the type A viruses belonged to the ASIA/Sea-97 lineage (see below).

3.3. Pool 2 (South Asia)

No new outbreaks of FMD were reported in South Asia.

3.4. Pool 3 (West Eurasia and Near East)

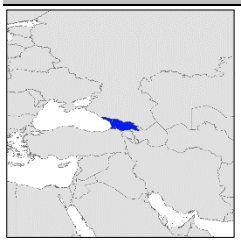
Armenia



Active and passive surveillance is being used in the country. Over 900,000 large and small ruminants were vaccinated against SAT2 in the period between July and September. 500 000 animals were vaccinated with a trivalent vaccine (O, A & Asia1)

FAO EuFMD FAST report Jul-Sep 2023

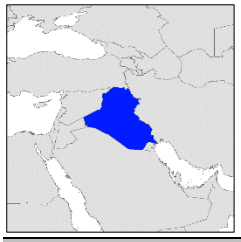
Georgia



Over 1 million large and small ruminants have been vaccinated in the July to September period. Vaccination comprises 240 000 animals with a monovalent SAT2 vaccine, over 350 000 animals with an O/A/Asia 1/SAT2 vaccine and over 500 000 animals with a O/A/Asia1 vaccine.

FAO EuFMD FAST report Jul-Sep 2023

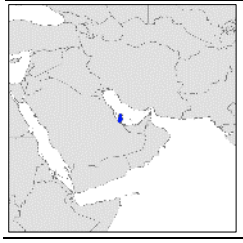
Iraq



107 cases of FMD were reported from Wasit, Ninawa, Baghdad and Dhiqar Provinces this quarter. Endemic FMDV serotypes of O, A and Asia1 were confirmed, along with SAT2/XIV.

FAO EuFMD FAST report Jul-Sep 2023

Qatar



On 14 July 2023, seven samples were received They had been collected from cattle during April and May 2023 from unspecified locations. They were all identified as **FMD type SAT1** and genotyped as topotype I, being most closely related to a virus collected from Kenya in 2020 (see below).

Oman

The presence of FMDV serotype SAT2, was reported via WAHIS. Twenty-three cases of FMD were diagnosed in cattle from Salalah Province, Dhofar province.

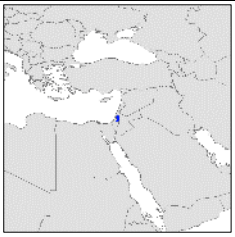
WOAH World Animal Health Information System (event ID: 5178)

ProMED post: 20230821.8711772

Pakistan

On 21 August 2023, a batch of 52 samples was received. They were collected from cattle and water buffalo in various provinces between January 2022 and February 2023. Eleven were identified as **FMD type O**, six as **FMD type A** and 12 as **FMD type Asia1**; 23 were **NVD** (no virus detected). Genotyping revealed all the type O viruses to belong to the ME-SA/PanAsia-2^{ANT-10} sublineage; the type A viruses belonged to the ASIA/Iran-05^{FAR-11} sublineage; and the Asia1 viruses belonged to the ASIA/Sindh-08 lineage (see below).

Palestine



On 15 August 2023, an **FMD type O** VP1 sequence was received from the Kimron Veterinary Institute. It was derived from a sample collected from sheep at Yatta (Hebron, West Bank) during August 2023. Genotyping revealed it to belong to the ME-SA/PanAsia-2^{ANT-10} sublineage (see below).

Cattle have been vaccinated with a polyvalent FMD vaccine (including SAT 2), with a target of complete coverage. While the vaccination of sheep (against serotypes O & A) will begin on October.

Samples targeting cattle in sheep in the Jordanian border region have been taken to look for evidence of SAT 2 infection.

FAO EuFMD FAST report Jul-Sep 2023

Türkiye

On 24 August 2023, a batch of 21 samples was received. They were collected from cattle (and one sheep) in various provinces between January and June 2023. Results are pending.

A total of 70 FMD (52 SAT2 and 18 untyped) outbreaks were reported this quarter. Serotype O has not been clinically detected since May.

In the Thrace region, over 25 000 animals have been clinically examined this quarter for FMD with almost 1 200 sera collected for testing by serology. In the buffer zone area, clinical surveillance was achieved in >90 percent of the epi-units. While in SE Anatolia clinical surveillance for early detection was implemented.

The Autumn vaccination campaign stated in September (using a quadrivalent [O, A, Asia1] vaccine and is planned to be completed by mid-November.

FAO EuFMD FAST report Jul-Sep 2023

3.5. Pool 4 (North and Eastern Africa)

Egypt

Over 1 million animals have been vaccinated against FMD in the July to September period.

FAO EuFMD FAST report Jul-Sep 2023

Ethiopia

On 19 September 2023, two VP1 sequences were received from the Botswana Vaccine Institute. One was **FMD type O** from a sample collected from cattle in Sebata District, Oromia Province during 2020. This was genotyped as topotype EA-4. The second sequence was of **FMD type A** and was derived from a sample collected from cattle in Kilte Awilailo District, Tigray Province in October 2018. This was genotyped as AFRICA/G-IV. Both were closely related to samples previously received by the WRLFMD from Ethiopia (see below).

3.6. Pool 5 (West/Central Africa)

Nigeria

On 25 August 2023, a batch of 13 samples was received. They were collected from cattle in Bauchi State during July 2023. Ten were identified as **FMD type O** and three were **FMDV-GD** (genome detected). All serotype O viruses were genotyped as belonging to the EA-3 topotype (see below).

3.7. Pool 6 (Southern Africa)

Malawi

A partial **FMD SAT2** VP1 sequence (543 nt) was received from the Botswana Vaccine Institute. No sample collection details were provided except that it had been collected from cattle during 2023. Genotyping showed that the sequence belonged to topotype II (see below).

South Africa	
	FMD cases that were reported in 2022 as FMD type SAT2 have now been redesignated as **FMD type SAT3**. WOAH World Animal Health Information System (event IDs: 3758 & 4368)

3.8. Pool 7 (South America)

No new outbreaks of FMD were reported in South America.

3.9. Extent of global surveillance

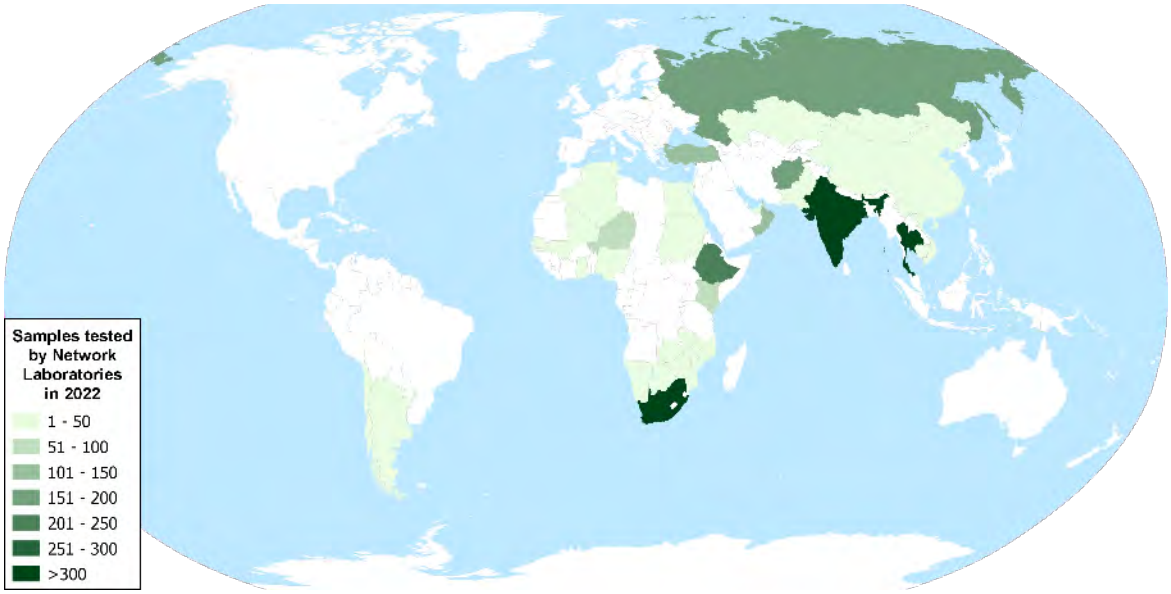


Figure 2: Samples received during 2022 from FMD outbreaks (routine surveillance that is undertaken in countries that are FMD-free without vaccination is not shown). Data from presentations given at the WOAH/FAO FMD reference laboratory network annual meeting (https://www.foot-and-mouth.org/Ref-Lab-Network/Network-Annual-Meeting).
Source: WRLFMD. Map conforms to the United Nations World map, June 2020.

In regions where FMD is endemic, continuous evolution of the virus generates geographically discrete lineages that are genetically distinct from FMD viruses found elsewhere. This report displays how different FMD lineages circulate in different regions; these analyses accommodate the latest epidemiological intelligence to assess the relative importance of the viral strains circulating within each region (see Table 1, below).

A number of outbreaks have occurred where samples have not been sent to the WRLFMD or other laboratories in the WOAH/FAO FMD Laboratory Network. An up-to-date list and reports of FMD viruses characterised by sequencing can be found at the following website: http://www.wrlfmd.org/country-reports/country-reports-2023.

Results from samples or sequences received at WRLFMD (status of samples being tested) are shown in Table 2 and a complete list of clinical sample diagnostics made by the WRLFMD from July to September 2023 is shown in Annex 1: (Summary of submissions). A record of all samples received by WRLFMD is shown in Annex 1: (Clinical samples).

Table 1: Conjectured relative prevalence of circulating FMD viral lineages in each Pool.

Lineage	Southeast / Central / East Asia [Pool 1]	South Asia [Pool 2]	West Eurasia & Near East [Pool 3]	North Africa	Eastern Africa [Pool 4]	West / Central Africa [Pool 5]	Southern Africa [Pool 6]	South America [Pool 7]
O ME-SA PanAsia-2			28					
O ME-SA PanAsia	10							
O SEA Mya-98	21.5							
O ME-SA Ind2001	40	86[1]	5.5	2				
O EA or O WA			2.5	55	55.5	65	16	
O EURO-SA								90
O CATHAY	10.5							
A ASIA Sea-97	18							
A ASIA Iran-05	0		25					
A ASIA G-VII		10	8					
A AFRICA				33	22	17		
A EURO-SA								10
Asia1	0	4	11					
SAT 1				0	8	3	16	
SAT 2			20	10	14	15	52	
SAT 3					0.5		16	
C								

[1] Includes cases due to the emerging O/ME-SA/SA-18 lineage that has been recently detected in Pool 2.

Note: For each of the regions, data represent the relative importance of each viral lineage (prevalence score estimated as a percentage [percent] of total FMD cases that occur in domesticated hosts). These scores (reviewed at the WOAH/FAO FMD reference laboratory network meeting in December 2021) can be used to inform the PRAGMATIST tool (see Annex 3). Recent changes to increase risks are shown in **red**, while a reduction in risk is shown in **green**. NB: In response to the FMD cases due to SAT2/XIV, risks in Pool 3 were reviewed and revised in April 2023.

Table 2: Status of sequencing of samples or sequences received by the WRLFMD from July to September 2023.

WRLFMD Batch No.	Date received	Country	Total No. samples	Serotype	No. of samples	No. of sequences	Sequencing status
WRLFMD/2023/000044	14/07/2023	Qatar	7	SAT 1	7	7	Finished
WRLFMD/2023/000046	18/07/2023	Republic of Korea	1	O	1	1	Finished
WRLFMD/2023/000070	16/08/2023	Thailand	24	O	17	17	Finished
				A	7	7	
WRLFMD/2023/000071	21/08/2023	Pakistan	50	O	11 *	11	Finished
				A	5	6 †	

WRLFMD Batch No.	Date received	Country	Total No. samples	Serotype	No. of samples	No. of sequences	Sequencing status
				Asia1	12 *	12	
				FMDV-GD	12		
				NVD	11		
WRLFMD/2023/000073	25/08/2023	Nigeria	13	O	10	10	Finished
				FMDV-GD	3		
Totals			**95**		**96**	**71**	

** One sample was determined to have O and Asia1 serotypes.*

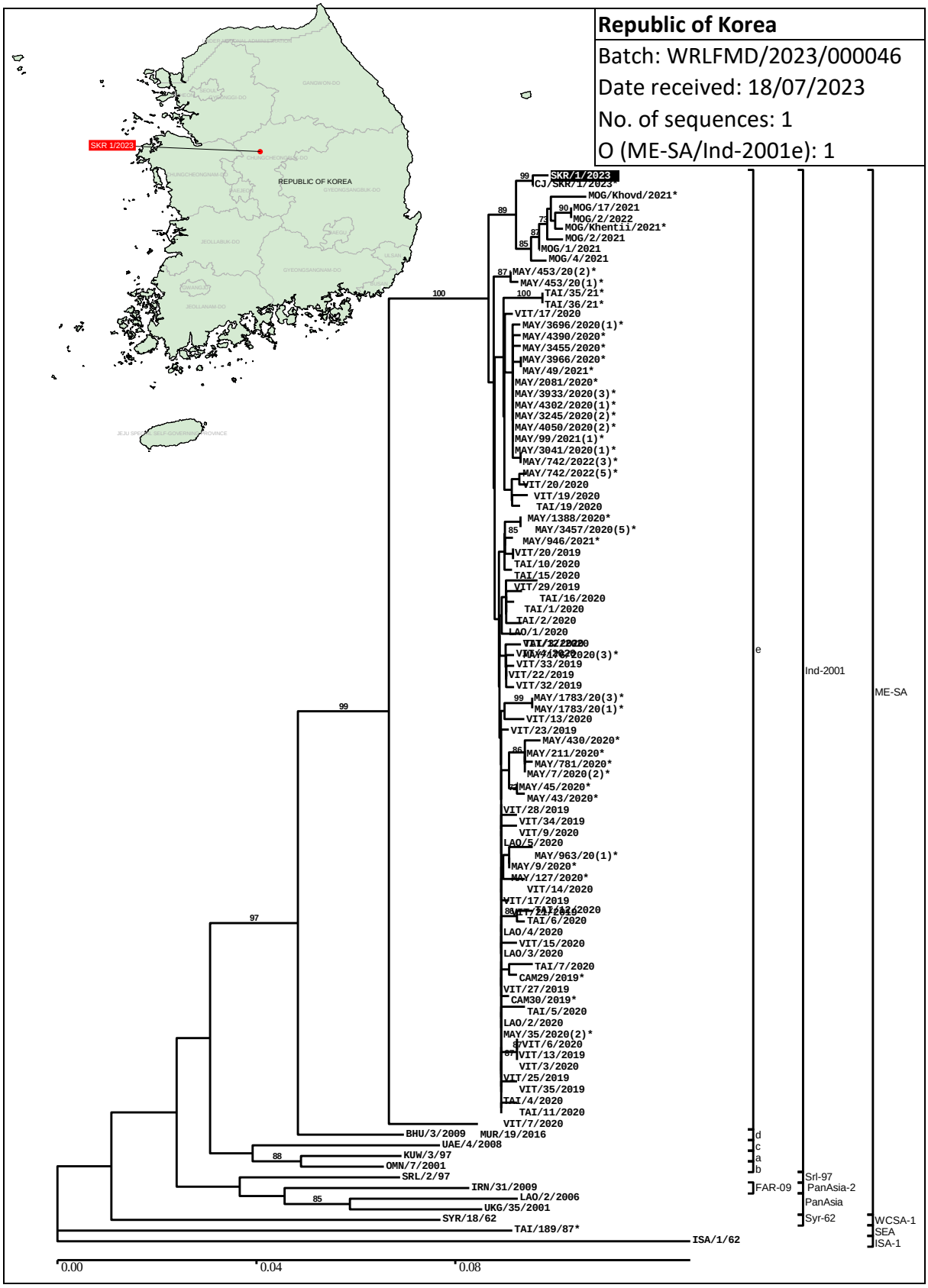
† One serotype A sample returned two different sequences.

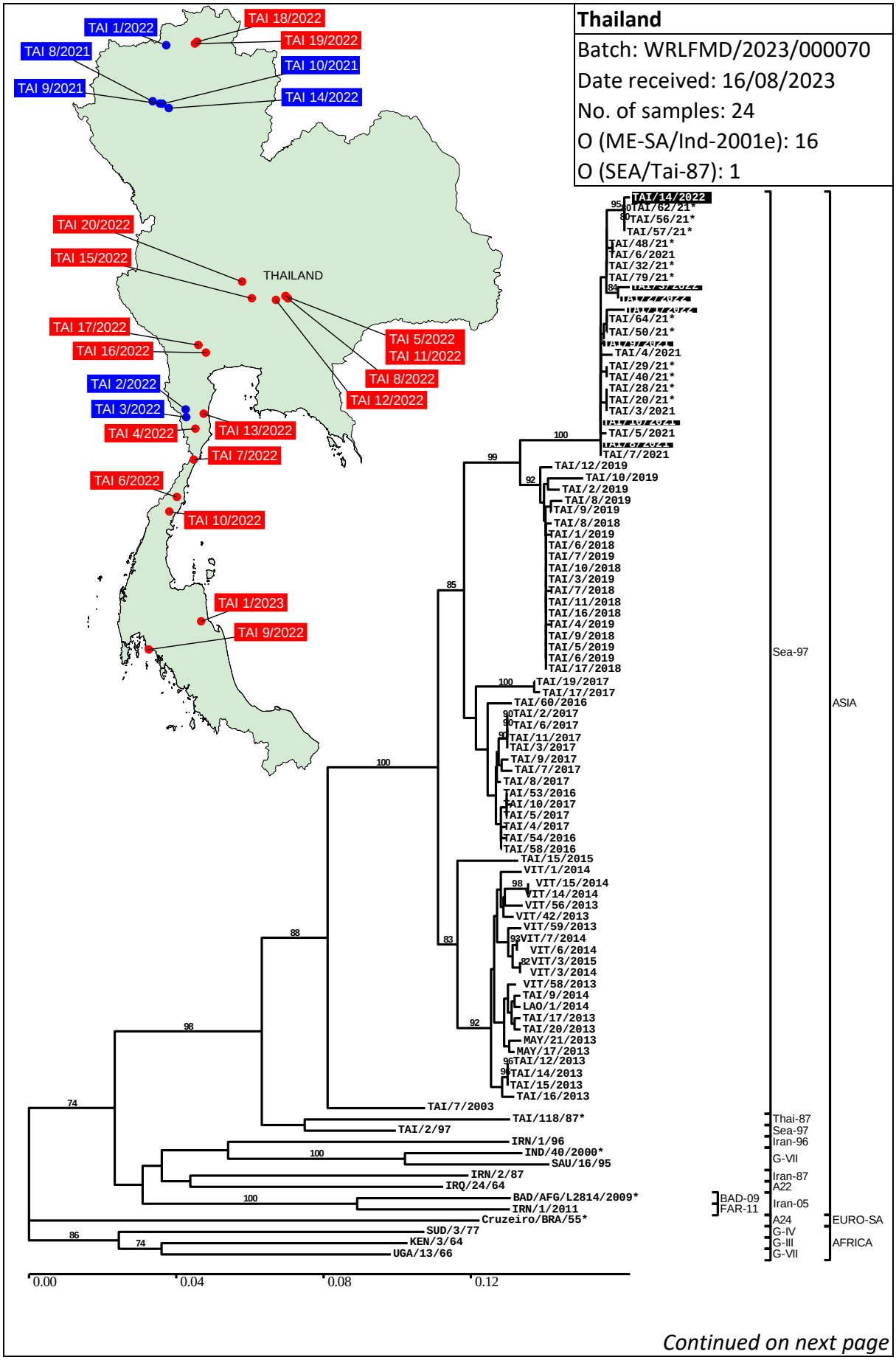
Table 3: VP1 sequences submitted by other FMD laboratories to the WRLFMD from July to September 2023.

WRLFMD Batch No.	Date received	Country	Serotype	Date Collected	No. of sequences	Submitting laboratory
WRLMEG/2023/000026	11/08/2023	Malawi	SAT 2	2023	1	BVI
WRLMEG/2023/000027	15/08/2023	Palestine	O	August 2023	1	KVI
WRLMEG/2023/000029	19/09/2023	Ethiopia	O	2020	1	BVI
			A	October 2018	1	
				Total	**4**	

4. Detailed analysis

4.1. Pool 1 (Southeast Asia/Central Asia/East Asia)





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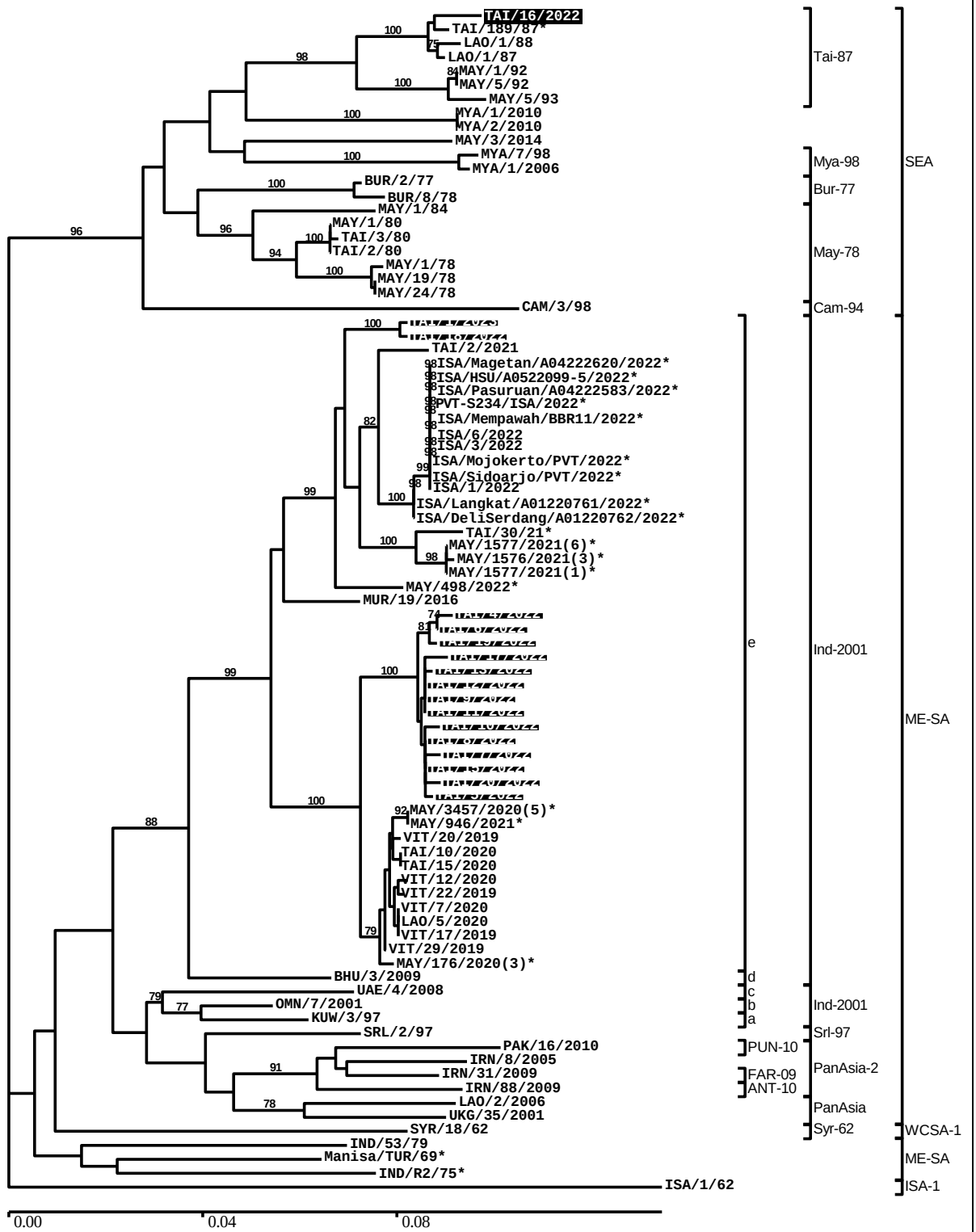
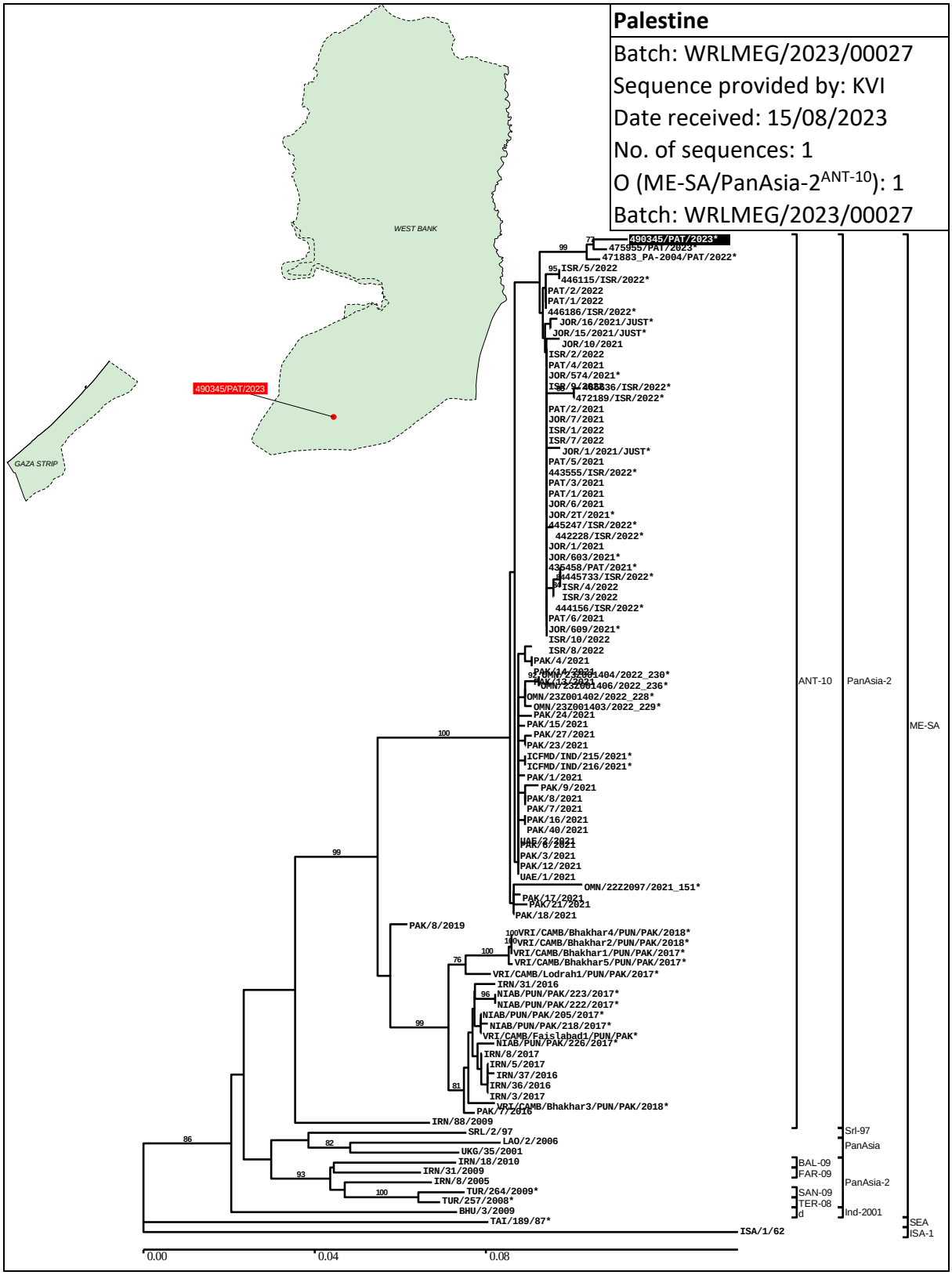
Thailand continued



4.2. Pool 2 (South Asia)

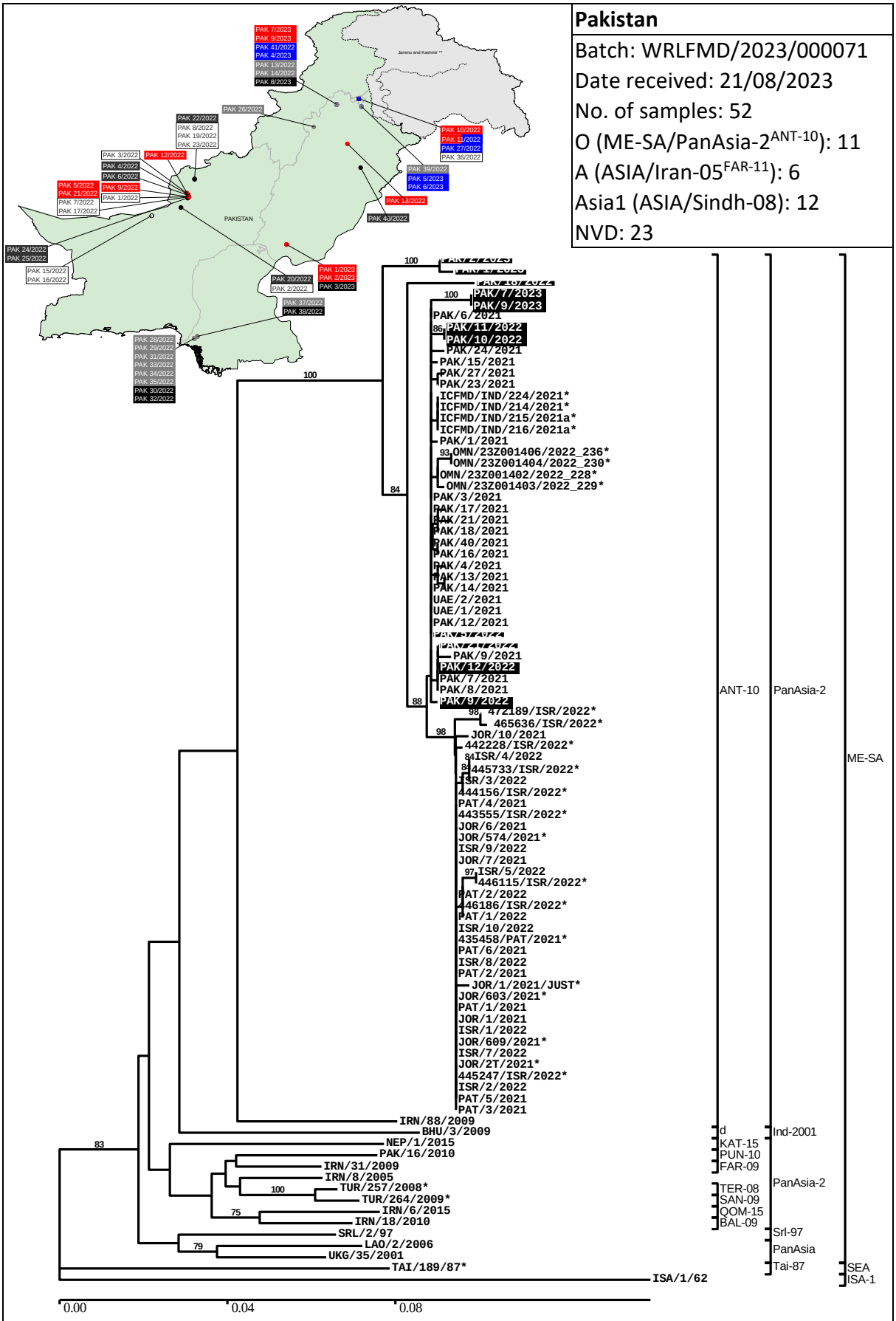
No samples/sequences received.

4.3. Pool 3 (West Eurasia and Near East)



Pakistan

Batch: WRLFMD/2023/000071
Date received: 21/08/2023
No. of samples: 52
O (ME-SA/PanAsia-2^{ANT-10}): 11
A (ASIA/Iran-05^{FAR-11}): 6
Asia1 (ASIA/Sindh-08): 12
NVD: 23



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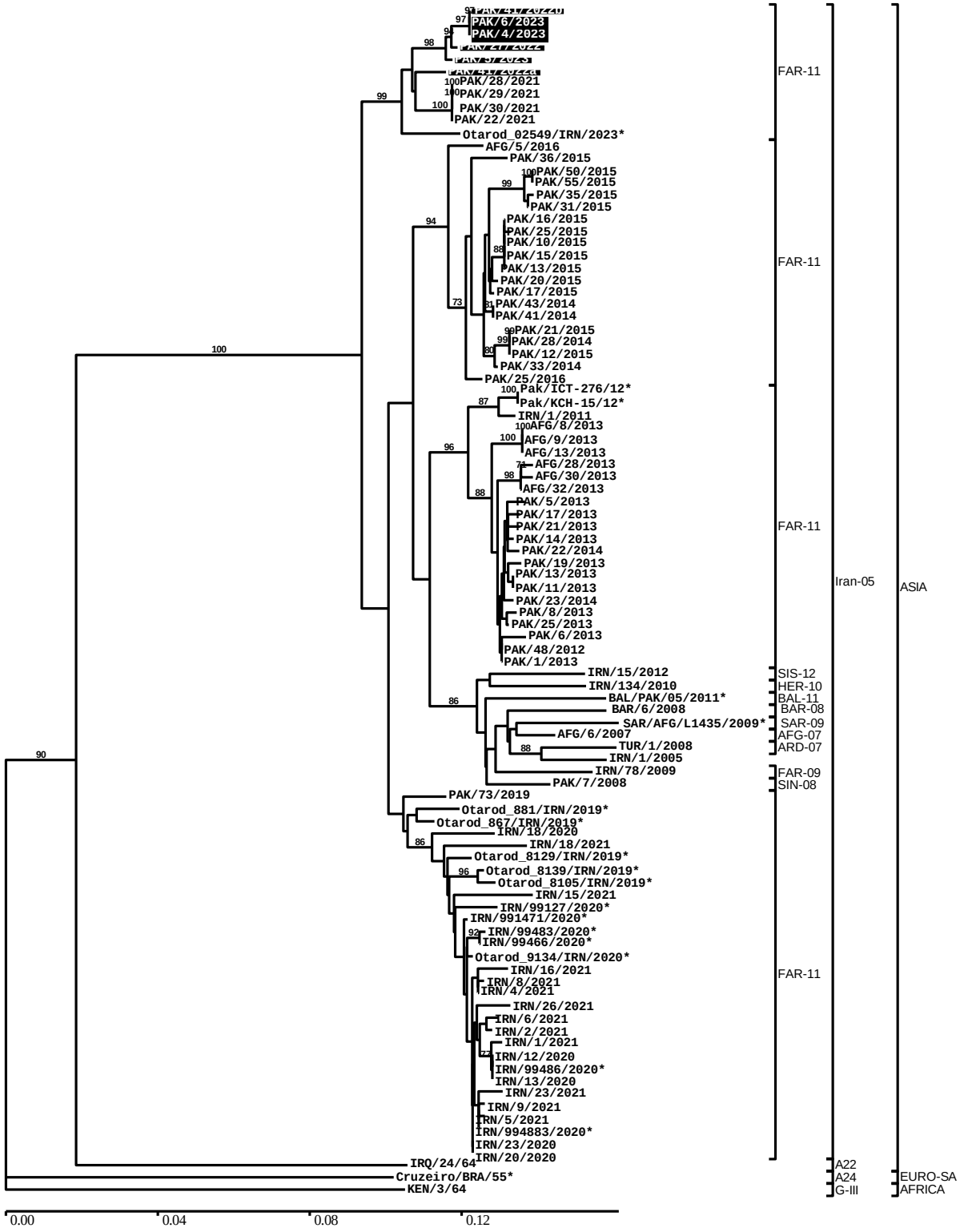
Pakistan continued



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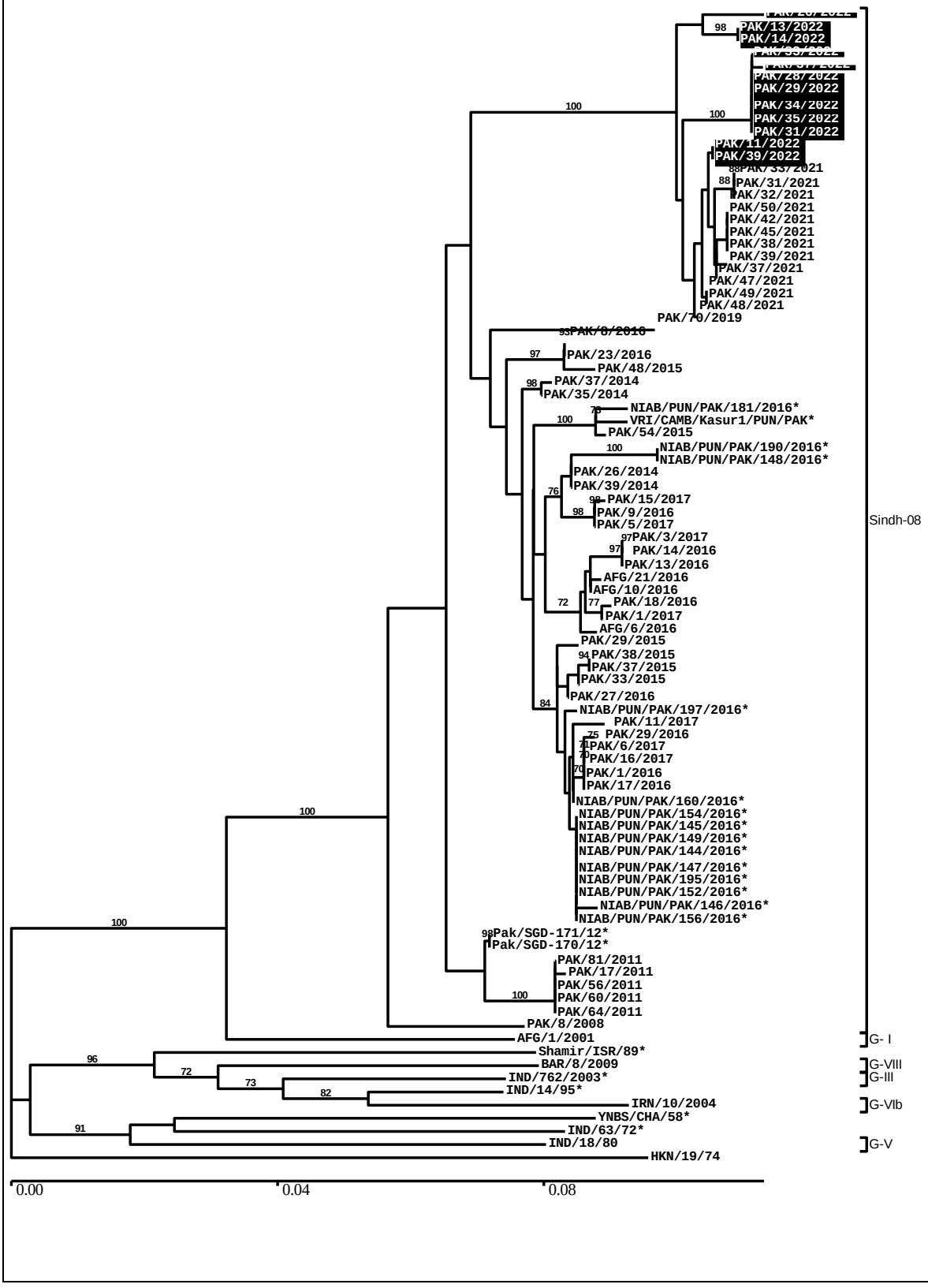
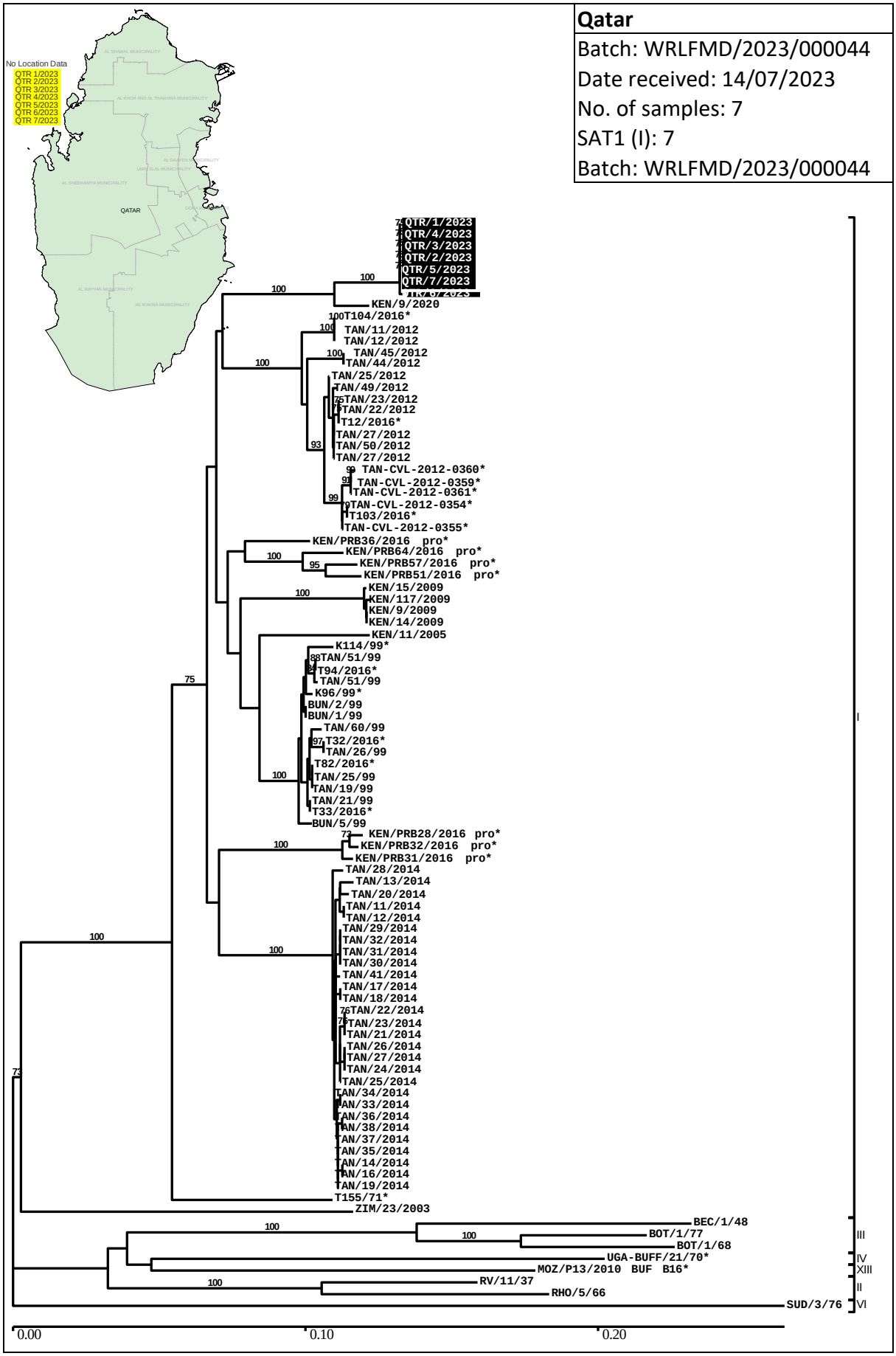
Pakistan continued




Qatar
Batch: WRLFMD/2023/000044
Date received: 14/07/2023
No. of samples: 7
SAT1 (I): 7
Batch: WRLFMD/2023/000044
No Location Data
QTR 1/2023
QTR 2/2023
QTR 3/2023
QTR 4/2023
QTR 5/2023
QTR 6/2023
QTR 7/2023
QATAR
QTR/1/2023
QTR/4/2023
QTR/3/2023
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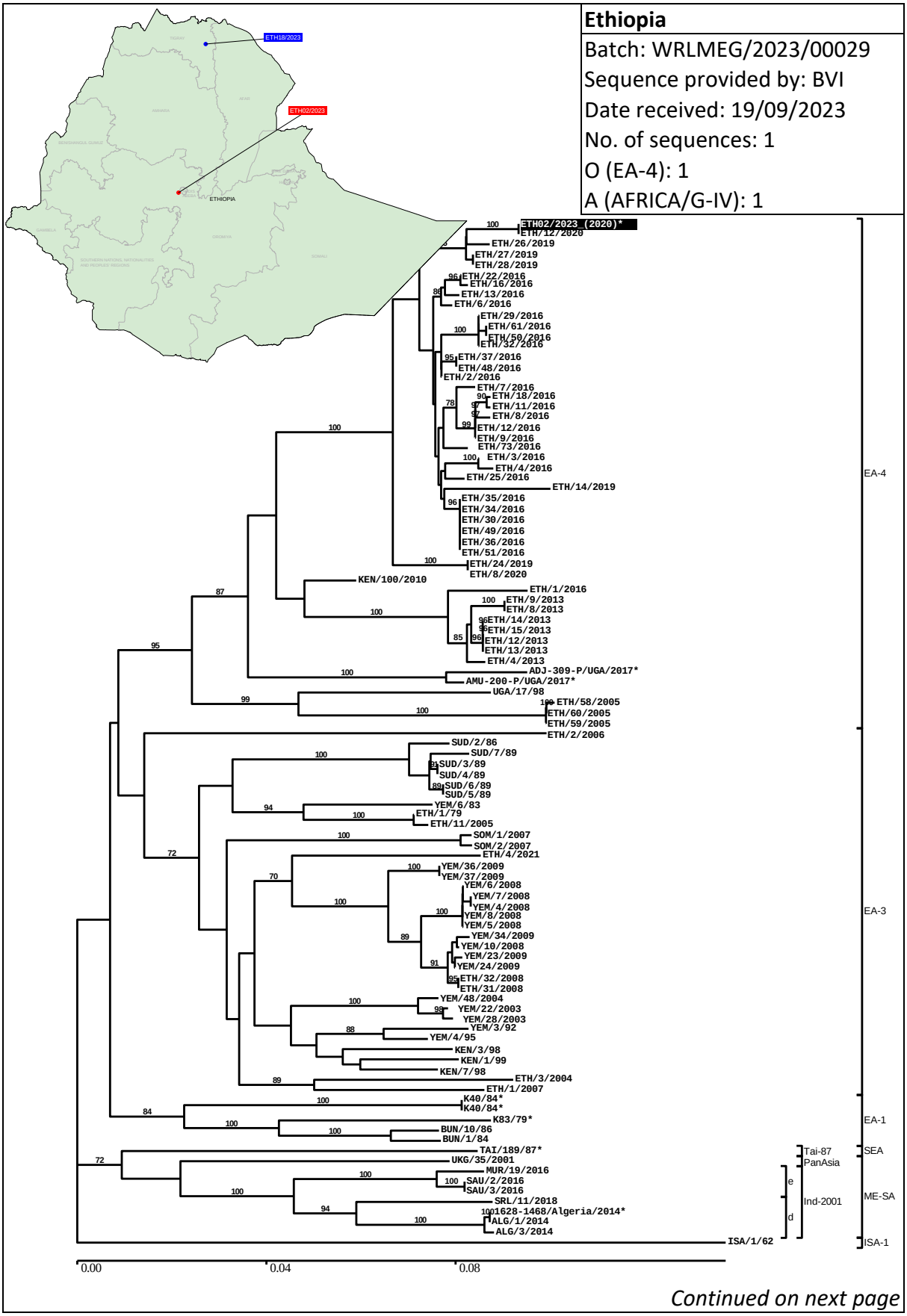
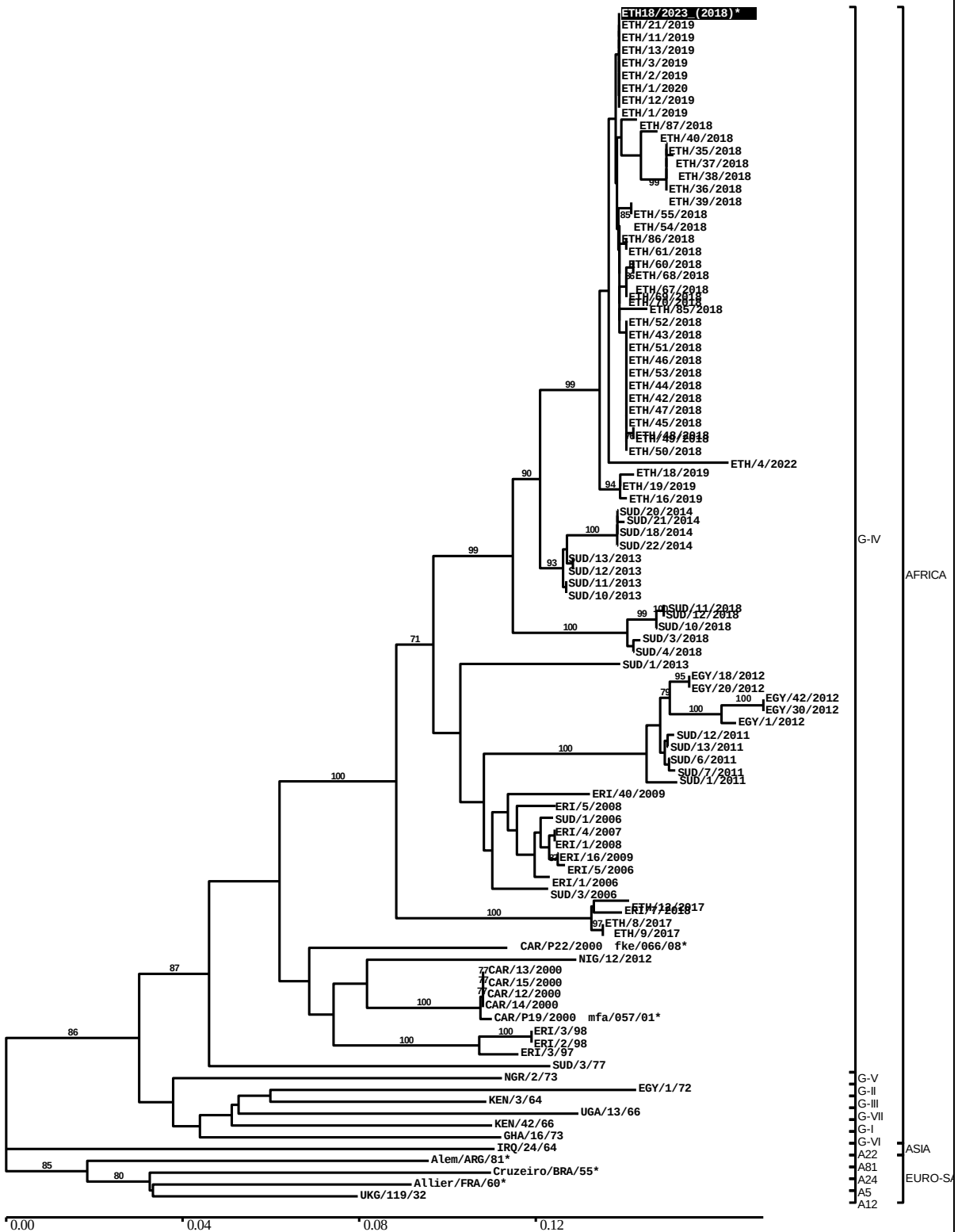
KEN/PRB64/2016 pro*
KEN/PRB57/2016 pro*
KEN/PRB51/2016 pro*
KEN/15/2009
KEN/117/2009
KEN/9/2009
KEN/14/2009
KEN/11/2005
K114/99*
TAN/51/99
T94/2016*
TAN/51/99
K96/99*
BUN/2/99
BUN/1/99
TAN/60/99
T32/2016*
TAN/26/99
T82/2016*
TAN/25/99
TAN/19/99
TAN/21/99
T33/2016*
BUN/5/99
KEN/PRB28/2016 pro*
KEN/PRB32/2016 pro*
KEN/PRB31/2016 pro*
TAN/28/2014
TAN/13/2014
TAN/20/2014
TAN/11/2014
TAN/12/2014
TAN/29/2014
TAN/32/2014
TAN/31/2014
TAN/30/2014
TAN/41/2014
TAN/17/2014
TAN/18/2014
TAN/22/2014
TAN/23/2014
TAN/21/2014
TAN/26/2014
TAN/27/2014
TAN/24/2014
TAN/25/2014
TAN/34/2014
TAN/33/2014
TAN/36/2014
TAN/38/2014
TAN/37/2014
TAN/35/2014
TAN/14/2014
TAN/16/2014
TAN/19/2014
T155/71*
ZIM/23/2003
BEC/1/48
BOT/1/77
BOT/1/68
UGA-BUFF/21/70*
MOZ/P13/2010 BUF B16*
RV/11/37
RHO/5/66
SUD/3/76
I
III
IV
XIII
II
VI
0.00
0.10
0.20

4.4. Pool 4 (North and East Africa)

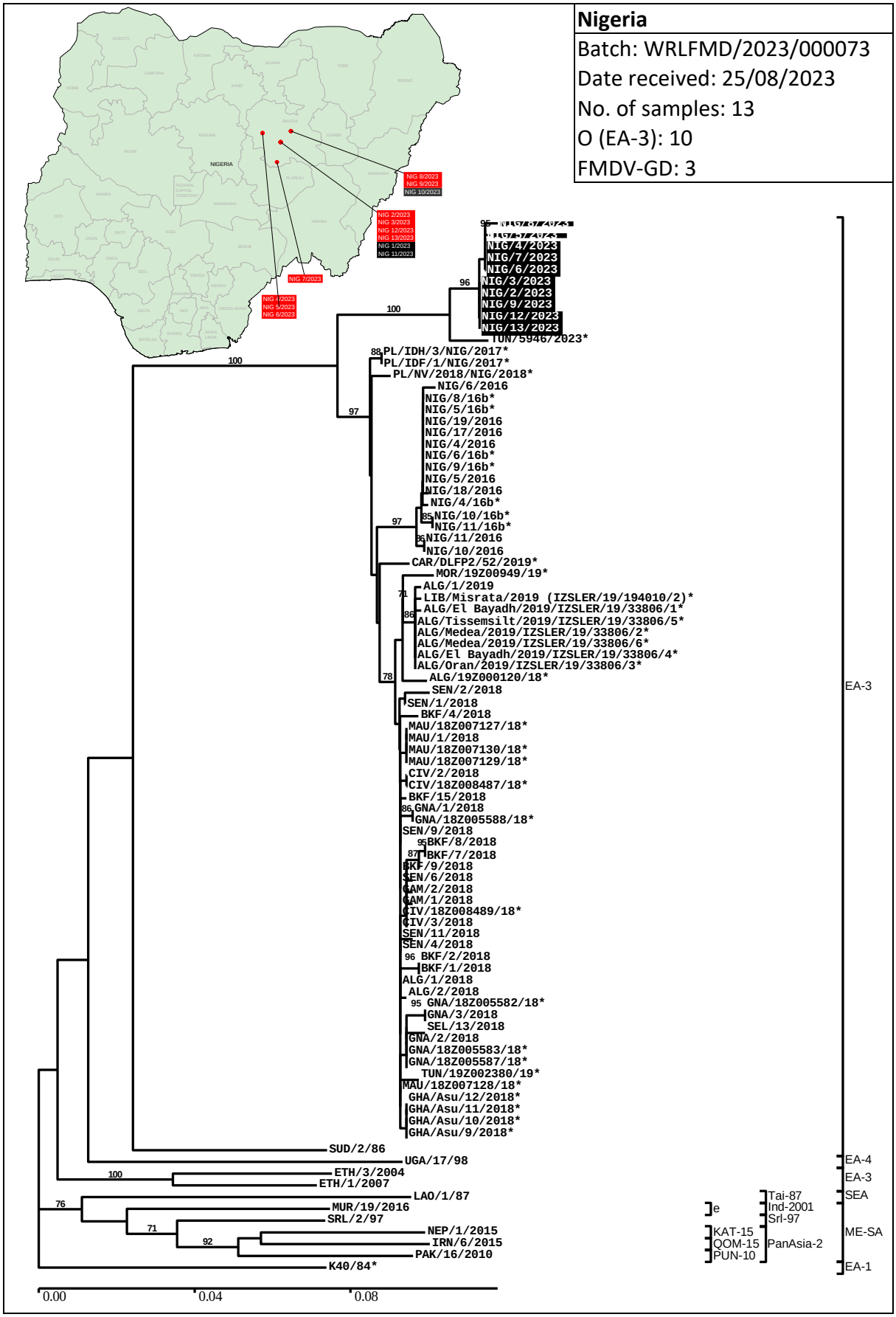


Continued on next page

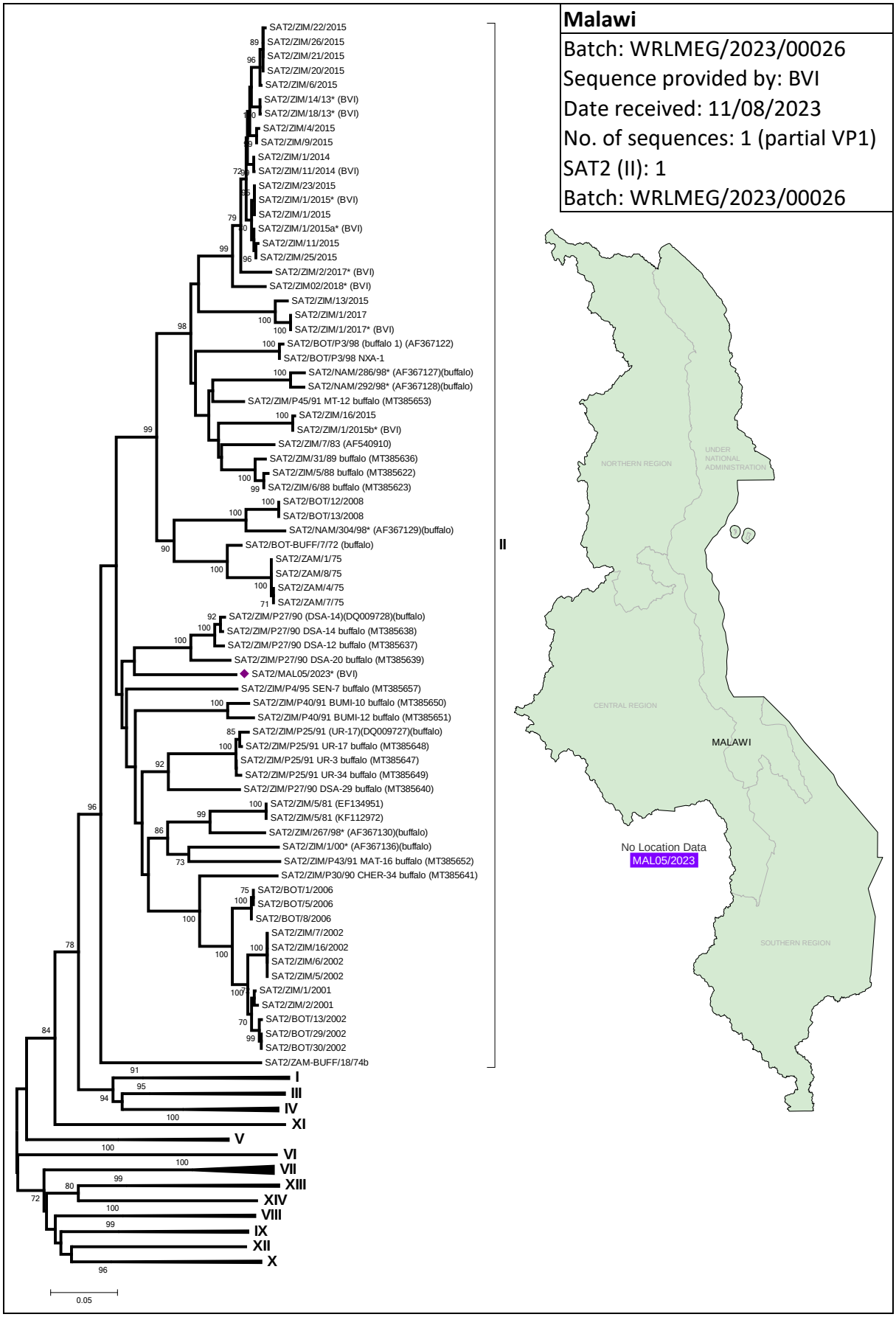
Ethiopia continued



4.5. Pool 5 (West/Central Africa)



4.6. Pool 6 (Southern Africa)



4.7. Pool 7 (South America)

No samples/sequences received.

4.8. Vaccine matching

Antigenic characterisation of FMD field isolates by matching with vaccine strains by 2dmVNT from July to September 2023.

NOTES:

1. Vaccine efficacy is influenced by vaccine potency, antigenic match and vaccination regime. Therefore, it is possible that a less than perfect antigenic match of a particular antigen may be compensated by using a high potency vaccine and by administering more than one vaccine dose at suitable intervals. Thus, a vaccine with a weak antigenic match to a field isolate, as determined by serology, may nevertheless afford some protection if it is of sufficiently high potency and is administered under a regime to maximise host antibody responses (Brehm, 2008).
2. Vaccine matching data generated in this report only considers antibody responses in cattle after a single vaccination (typically 21 days after vaccination). The long-term performance of FMD vaccines after a second or multiple doses of vaccine should be monitored using post-vaccination serological testing.

Table 4: Summary of samples tested by vaccine matching.

Serotype	O	A	C	Asia1	SAT 1	SAT 2	SAT 3
Bahrain	-	-	-	-	-	2	-
Nepal	3	-	-	-	-	-	-
Qatar	-	-	-	-	3	-	-
Republic of Korea	1	-	-	-	-	-	-
Total	**4**	**0**	**0**	**0**	**3**	**2**	**0**

Abbreviations used in tables

For each field isolate the r_1 value is shown followed by the heterologous neutralisation titre (r_1-value / titre). The r_1 values shown below, represent the one-way serological match between vaccine strain and field isolate, calculated from the comparative reactivity of antisera raised against the vaccine in question. Heterologous neutralisation titres for vaccine sera with the field isolates are included as an indicator of cross-protection.

M	**Vaccine Match** *r_1 = ≥ 0.3 - suggests that there is a close antigenic relationship between field isolate and vaccine strain. A potent vaccine containing the vaccine strain is likely to confer protection.*
N	**No Vaccine Match** *r_1 = < 0.3* - suggest that the field isolate is antigenically different to the vaccine strain. Where there is no alternative, the use of this vaccine should carefully consider vaccine potency, the possibility to use additional booster doses and monitoring of vaccinated animals for heterologous responses.
NT	**Not tested against this vaccine**

NOTE: A "0" in the neutralisation columns indicates that for that particular field virus no neutralisation was observed at a virus dose of a 100 $TCID_{50}$.

NOTE: This report includes the source of the vaccine virus and bovine vaccinal serum. Vaccines from different manufactures may perform differently and caution should be taken when comparing the data.

Table 5: Vaccine matching studies for O FMDV

Isolate	Serotype O		O 3039 *Boehringer Ingelheim*		O Campos *Boehringer Ingelheim*		O_1 Campos *Biogénesis Bagó*		O Manisa *Boehringer Ingelheim*		PanAsia 2 *Boehringer Ingelheim*		O/TUR/5/09 *MSD*	
	Topotype	Lineage	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*
O/NEP 58/2021	ME-SA	Ind-2001	0.51	*1.70*	0.16	*1.87*	0.20	*2.28*	0.49	*2.22*	0.21	*1.87*	0.78	*2.21*
O/SKR 1/2023	ME-SA	Ind-2001	0.93	*2.02*	0.77	*2.23*	0.88	*2.74*	0.74	*2.23*	0.98	*2.37*	0.80	*2.24*
O/NEP 13/2022	ME-SA	SA-2018	1.00	*2.02*	0.40	*2.28*	0.51	*2.65*	0.63	*2.33*	0.57	*2.35*	1.00	*2.32*
O/NEP 26/2022	ME-SA	SA-2018	0.66	*1.82*	0.23	*2.03*	0.20	*2.29*	0.32	*2.04*	0.32	*2.10*	0.68	*2.15*

Table 6: Vaccine matching studies for SAT1 FMDV

Isolate	Serotype SAT 2		SAT1 Rho 78 *Boehringer Ingelheim*	
	Topotype	Lineage	r_1	*titre*
QTR 5/2023	I (NWZ)	-	0.39	*1.85*
QTR 6/2023	I (NWZ)	-	0.41	*1.86*
QTR 7/2023	I (NWZ)	-	0.35	*1.80*

Table 7: Vaccine matching studies for SAT 2 FMDV

Isolate	Serotype SAT 2		Eritrea 98 *Boehringer Ingelheim*		SAT2 Zim 83 *Boehringer Ingelheim*	
	Topotype	Lineage	r_1	*titre*	r_1	*titre*
BAR 2/2022	XIV	-	0.40	*1.50*	0.39	*1.85*
BAR 7/2022	XIV	-	0.53	*1.62*	0.53	*1.99*

Annex 1: Sample data

Summary of submissions

Table 8: Summary of samples collected and received to WRLFMD July to September 2023

Country	Nº of samples	Virus isolation in cell culture/ELISA								RT-PCR for FMD	
		FMD virus serotypes							No Virus Detected		
		O	*A*	*C*	*SAT 1*	*SAT 2*	*SAT 3*	*ASIA1*		*Positive*	*Negative*
Nigeria	13	10	-	-	-	-	-	-	3	13	-
Pakistan	50	11	5	-	-	-	-	12	23	39	11
Qatar	7	-	-	-	7	-	-	-	-	7	-
Republic of Korea	1	1	-	-	-	-	-	-	-	1	-
Thailand	24	17	7	-	-	-	-	-	-	24	-
TOTAL	**95**	**39**	**12**	**0**	**7**	**0**	**0**	**12**	**26**	**74**	**11**

Clinical samples

Table 9: Clinical sample diagnostics made by the WRLFMD July to September 2023

Country	Date		WRL for FMD Sample Identification	Animal	Date of Collection	Results		
	Received	Reported				VI/ELISA	RT-PCR	Final report
Nigeria	25-Aug-2023	25-Sep-2023	NIG 1/2023	Cattle	05-Jul-23	NVD	FMDV GD	FMDV GD
			NIG 2/2023	Cattle	05-Jul-23	O	FMDV GD	O
			NIG 3/2023	Cattle	05-Jul-23	O	FMDV GD	O
			NIG 4/2023	Cattle	19-Jul-23	O	FMDV GD	O
			NIG 5/2023	Cattle	19-Jul-23	O	FMDV GD	O
			NIG 6/2023	Cattle	19-Jul-23	O	FMDV GD	O
			NIG 7/2023	Cattle	19-Jul-23	O	FMDV GD	O
			NIG 8/2023	Cattle	21-Jul-23	O	FMDV GD	O
			NIG 9/2023	Cattle	21-Jul-23	O	FMDV GD	O
			NIG 10/2023	Cattle	21-Jul-23	NVD	FMDV GD	FMDV GD
			NIG 11/2023	Cattle	23-Jul-23	NVD	FMDV GD	FMDV GD
			NIG 12/2023	Cattle	23-Jul-23	O	FMDV GD	O
			NIG 13/2023	Cattle	23-Jul-23	O	FMDV GD	O
Pakistan	21-Aug-2023	29-sep-2023	PAK 1/2022	Buffalo	15-Jan-22	NVD	NVD	NVD
			PAK 2/2022	Cattle	15-Jan-22	NVD	NVD	NVD
			PAK 3/2022	Cattle	18-Jan-22	NVD	NVD	NVD
			PAK 4/2022	Cattle	22-Jan-22	NVD	FMDV GD	FMDV GD

Country	Date		WRL for FMD Sample Identification	Animal	Date of Collection	Results		
	Received	Reported				VI/ELISA	RT-PCR	Final report
			PAK 5/2022	Buffalo	07-Feb-22	O	FMDV GD	O
			PAK 6/2022	Buffalo	11-Feb-22	NVD	FMDV GD	FMDV GD
			PAK 7/2022	Buffalo	19-Feb-22	NVD	NVD	NVD
			PAK 8/2022	Cattle	25-Feb-22	NVD	NVD	NVD
			PAK 9/2022	Cattle	02-Mar-22	O	FMDV GD	O
			PAK 10/2022	Cattle	02-Mar-22	O	FMDV GD	O
			PAK 11/2022	Cattle	02-Mar-22	O & Asia1	FMDV GD	O & Asia1
			PAK 12/2022	Cattle	05-Mar-22	O	FMDV GD	O
			PAK 13/2022	Cattle	07-Mar-22	Asia1	FMDV GD	Asia1
			PAK 14/2022	Cattle	07-Mar-22	Asia1	FMDV GD	Asia1
			PAK 15/2022	Cattle	10-Mar-22	NVD	NVD	NVD
			PAK 16/2022	Cattle	10-Mar-22	NVD	NVD	NVD
			PAK 17/2022	Buffalo	12-Mar-22	NVD	NVD	NVD
			PAK 18/2022	Buffalo	25-Mar-22	O	FMDV GD	O
			PAK 19/2022	Cattle	07-Apr-22	NVD	NVD	NVD
			PAK 20/2022	Cattle	18-Apr-22	NVD	FMDV GD	FMDV GD
			PAK 21/2022	Buffalo	19-Apr-22	O	FMDV GD	O
			PAK 22/2022	Cattle	23-Apr-22	NVD	FMDV GD	FMDV GD
			PAK 23/2022	Cattle	28-Apr-22	NVD	NVD	NVD
			PAK 24/2022	Cattle	06-May-22	NVD	FMDV GD	FMDV GD
			PAK 25/2022	Cattle	06-May-22	NVD	FMDV GD	FMDV GD
			PAK 26/2022	Cattle	17-May-22	Asia1	FMDV GD	Asia1
			PAK 27/2022	Cattle	23-Aug-22	A	FMDV GD	A
			PAK 28/2022	Cattle	01-Oct-22	Asia1	FMDV GD	Asia1
			PAK 29/2022	Cattle	01-Oct-22	Asia1	FMDV GD	Asia1
			PAK 30/2022	Cattle	02-Oct-22	NVD	FMDV GD	FMDV GD
			PAK 31/2022	Cattle	12-Oct-22	Asia1	FMDV GD	Asia1
			PAK 32/2022	Cattle	12-Oct-22	NVD	FMDV GD	FMDV GD
			PAK 33/2022	Cattle	13-Oct-22	Asia1	FMDV GD	Asia1
			PAK 34/2022	Cattle	13-Oct-22	Asia1	FMDV GD	Asia1
			PAK 35/2022	Cattle	14-Oct-22	Asia1	FMDV GD	Asia1
			PAK 36/2022	Cattle	02-Nov-22	NVD	NVD	NVD
			PAK 37/2022	Cattle	10-Nov-22	Asia1	FMDV GD	Asia1
			PAK 38/2022	Cattle	13-Nov-22	NVD	FMDV GD	FMDV GD
			PAK 39/2022	Cattle	22-Nov-22	Asia1	FMDV GD	Asia1
			PAK 40/2022	Cattle	25-Nov-22	NVD	FMDV GD	FMDV GD
			PAK 41/2022	Cattle	26-Nov-22	A	FMDV GD	A
			PAK 1/2023	Cattle	03-Jan-23	O	FMDV GD	O
			PAK 2/2023	Cattle	03-Jan-23	O	FMDV GD	O
			PAK 3/2023	Cattle	03-Jan-23	NVD	FMDV GD	FMDV GD
			PAK 4/2023	Cattle	01-Feb-23	A	FMDV GD	A

Country	Date		WRL for FMD Sample Identification	Animal	Date of Collection	Results		
	Received	Reported				VI/ELISA	RT-PCR	Final report
			PAK 5/2023	Cattle	07-Feb-23	A	FMDV GD	A
			PAK 6/2023	Cattle	07-Feb-23	A	FMDV GD	A
			PAK 7/2023	Cattle	10-Feb-23	O	FMDV GD	O
			PAK 8/2023	Cattle	11-Feb-23	NVD	FMDV GD	FMDV GD
			PAK 9/2023	Cattle	22-Feb-23	O	FMDV GD	O
Qatar	14-Jul-2023	27-Jul-2023	QTR 1/2023	Cattle	23-Apr-23	SAT1	FMDV GD	SAT1
			QTR 2/2023	Cattle	23-Apr-23	SAT1	FMDV GD	SAT1
			QTR 3/2023	Cattle	23-Apr-23	SAT1	FMDV GD	SAT1
			QTR 4/2023	Cattle	23-Apr-23	SAT1	FMDV GD	SAT1
			QTR 5/2023	Cattle	09-May-23	SAT1	FMDV GD	SAT1
			QTR 6/2023	Cattle	14-May-23	SAT1	FMDV GD	SAT1
			QTR 7/2023	Cattle	14-May-23	SAT1	FMDV GD	SAT1
Republic of Korea	18-Jul-2023	24-Jul-2023	SKR 1/2023	Cattle	14-May-23	O	FMDV GD	O
Thailand	16-Aug-2023	21-Sep-2023	TAI 8/2021	Cattle	11-Nov-21	A	FMDV GD	A
			TAI 9/2021	Cattle	11-Nov-21	A	FMDV GD	A
			TAI 10/2021	Cattle	11-Nov-21	A	FMDV GD	A
			TAI 1/2022	Cattle	27-Jan-22	A	FMDV GD	A
			TAI 2/2022	Cattle	16-Mar-22	A	FMDV GD	A
			TAI 3/2022	Cattle	21-Apr-22	A	FMDV GD	A
			TAI 4/2022	Cattle	11-Aug-22	O	FMDV GD	O
			TAI 5/2022	Cattle	17-Aug-22	O	FMDV GD	O
			TAI 6/2022	Cattle	18-Aug-22	O	FMDV GD	O
			TAI 7/2022	Cattle	26-Aug-22	O	FMDV GD	O
			TAI 8/2022	Cattle	05-Sep-22	O	FMDV GD	O
			TAI 9/2022	Cattle	05-Sep-22	O	FMDV GD	O
			TAI 10/2022	Cattle	08-Sep-22	O	FMDV GD	O
			TAI 11/2022	Cattle	13-Sep-22	O	FMDV GD	O
			TAI 12/2022	Cattle	19-Sep-22	O	FMDV GD	O
			TAI 13/2022	Cattle	28-Sep-22	O	FMDV GD	O
			TAI 14/2022	Cattle	30-Sep-22	A	FMDV GD	A
			TAI 15/2022	Cattle	06-Oct-22	O	FMDV GD	O
			TAI 16/2022	Cattle	10-Oct-22	O	FMDV GD	O
			TAI 17/2022	Cattle	28-Oct-22	O	FMDV GD	O
			TAI 18/2022	Cattle	04-Nov-22	O	FMDV GD	O
			TAI 19/2022	Cattle	20-Dec-22	O	FMDV GD	O
			TAI 20/2022	Cattle	20-Dec-22	O	FMDV GD	O
			TAI 1/2023	Cattle	05-Jan-23	O	FMDV GD	O
TOTAL					**95**			

Annex 2: FMD publications

Recent FMD Publications July to September 2023 cited by Web of Science.

1. **Arshad, S., S. Raza, R. Rafique, I. Altaf, and A. Sattar**. 2023. Lack of antiviral activity of ivermectin against *Foot-and-mouth disease virus* serotype O in BALB/c mice. *Microbial Pathogenesis*, **182**: 5. DOI: 10.1016/j.micpath.2023.106245.
2. **Aslam, M. and K.A. Alkheraije**. 2023. The prevalence of foot-and-mouth disease in Asia. *Frontiers in Veterinary Science*, **10**: 15. DOI: 10.3389/fvets.2023.1201578.
3. **Bhat, N.A., L. Jeri, D. Karmakar, P. Mipun, P. Bharali, N. Sheikh, C.J. Nongkynrih, and Y. Kumar**. 2023. Ethnoveterinary practises of medicinal plants used for the treatment of different cattle diseases: A case study in East Khasi Hill district of Meghalaya, North East India. *Heliyon*, **9**(7): 24. DOI: 10.1016/j.heliyon.2023.e18214.
4. **Biswal, J.K., R. Ranjan, J.K. Mohapatra, M. Rout, H.R. Joshi, and R.P. Singh**. 2023. Development of TaqMan probe-based one-step RT-qPCR assay targeting 2b-NSP coding region for diagnosis of foot-and-mouth disease in India. *Current Microbiology*, **80**(8): 11. DOI: 10.1007/s00284-023-03369-y.
5. **Blacksell, S.D., S. Dhawan, M. Kusumoto, K.K. Le, K. Summermatter, J. O'Keefe, J. Kozlovac, S.S. Almuhairi, I. Sendow, C.M. Scheel, A. Ahumibe, Z.M. Masuku, A.M. Bennett, K. Kojima, D.R. Harper, and K. Hamilton**. 2023. The biosafety research road map: the search for evidence to support practices in the laboratory-*Foot-and-mouth disease virus*. *Applied Biosafety*: 17. DOI: 10.1089/apb.2022.0041.
6. **Bosso, F.B., V. de Sá Jayme, W.F.P. Teixeira, and G.R.L. de Souza**. 2023. Multicriteria analysis model for foot-and-mouth disease risk classification in the state of Goias - Brazil (vol 53, e20220669, 2023). *Ciencia Rural*, **53**(11): 1. DOI: 10.1590/01038478crerr20220669.
7. **Capozzo, A.V., W. Vosloo, T. de los Santos, A.M. Perez, and M. Perez-Filgueira**. 2023. Editorial: Foot-and-mouth disease epidemiology, vaccines and vaccination: moving forward. *Frontiers in Veterinary Science*, **10**: 3. DOI: 10.3389/fvets.2023.1231005.
8. **Dahiya, S.S., S. Subramaniam, J.K. Mohapatra, M. Rout, J.K. Biswal, P. Giri, V. Nayak, and R.P. Singh.** 2023. *Foot-and-mouth disease virus* serotype O exhibits phenomenal genetic lineage diversity in India during 2018-2022. *Viruses-Basel*, **15**(7): 16. DOI: 10.3390/v15071529.
9. **Dobson, S.J., J.C. Ward, M.R. Herod, D.J. Rowlands, and N.J. Stonehouse**. 2023. A highly discriminatory RNA strand- specific assay to facilitate analysis of the role of cis-acting elements in *Foot-and-mouth disease virus* replication. *Journal of General Virology*, **104**(7): 9. DOI: 10.1099/jgv.0.001871.
10. **Gadir, M., S.M. Azimi, N. Harzandi, B. Hemati, and N. Eskandarzade**. 2023. Molecular detection, genetic diversity, and phylogenetic analysis of *Foot-and-mouth disease virus* (FMDV) type O in Iran during 2015-2016. *Iranian Journal of Veterinary Research*, **24**(1): 30-36. DOI: 10.22099/ijvr.2022.43156.6284.
11. **Gao, Y., F. Yong, M.L. Yan, Y.Q. Wei, and X.C. Wu**. 2023. MiR-361 and miR-34a suppress *Foot-and-mouth disease virus* proliferation by activating immune response signaling in PK-15 cells. *Veterinary Microbiology*, **280**: 10. DOI: 10.1016/j.vetmic.2023.109725.
12. **Hossain, K.A., H. Anjume, K.M.M. Alam, A. Yeamin, S. Akter, M.A. Hossain, and M.**

Sultana. 2023. Emergence of a novel sublineage, MYMBD21 under SA-2018 lineage of *Foot-and-mouth disease virus* serotype O in Bangladesh. *Scientific Reports*, **13**(1): 12. DOI: 10.1038/s41598-023-36830-w.

13. **Kabelo, T.I., E.M. Fana, J.M. Hyera, and K. Lebani**. 2023. A review of foot-and-mouth disease status and control measures in Botswana. *Tropical Animal Health and Production*, **55**(4): 11. DOI: 10.1007/s11250-023-03674-5.

14. **Khulape, S.A., J.K. Biswal, C. Jana, S. Subramaniam, and R.P. Singh**. 2023. Novel pan-lineage VP1 specific degenerate primers for precise genetic characterization of serotype O *Foot-and-mouth disease virus* circulating in India. *Journal of Veterinary Science*, **24**(3): 6. DOI: 10.4142/jvs.22292.

15. **Kim, J.Y., J.H. Lee, J.M. Yang, S.Y. Lee, S.Y. Park, J.S. Jin, D. Kim, J.W. Park, J.H. Park, S.H. Park, and Y.J. Ko.** 2023. Production of foot-and-mouth disease type O and a vaccine antigens on a pilot scale and determination of optimal amount of antigen for monovalent vaccines. *Vaccines*, **11**(7): 10. DOI: 10.3390/vaccines11071156.

16. **Ko, M.K., H.W. Kim, S.H. Park, J.H. Park, S.M. Kim, and M.J. Lee**. 2023. The role of zinc sulfate in enhancing cellular and humoral immune responses to foot-and-mouth disease vaccine. *Virus Research*, **335**: 12. DOI: 10.1016/j.virusres.2023.199189.

17. **Kumar, V., S. Dahiya, S. Budania, A.K. Gupta, P. Sangwan, A. Lather, P. Kumar, N.K. Kakker, and A. Singh**. 2023. Characterization of *Foot-and-mouth disease virus* serotype O-specific single domain antibody expressed in the pET expression system. *Indian Journal of Microbiology*: 7. DOI: 10.1007/s12088-023-01095-4.

18. **Lelenguyah, G.L., M.M. Nyangito, O.V. Wasonga, and R.C. Bett**. 2023. Spatio-temporal epidemiology of livestock diseases in the variable semi-arid rangelands of northern Kenya. *Tropical Animal Health and Production*, **55**(4): 22. DOI: 10.1007/s11250-023-03684-3.

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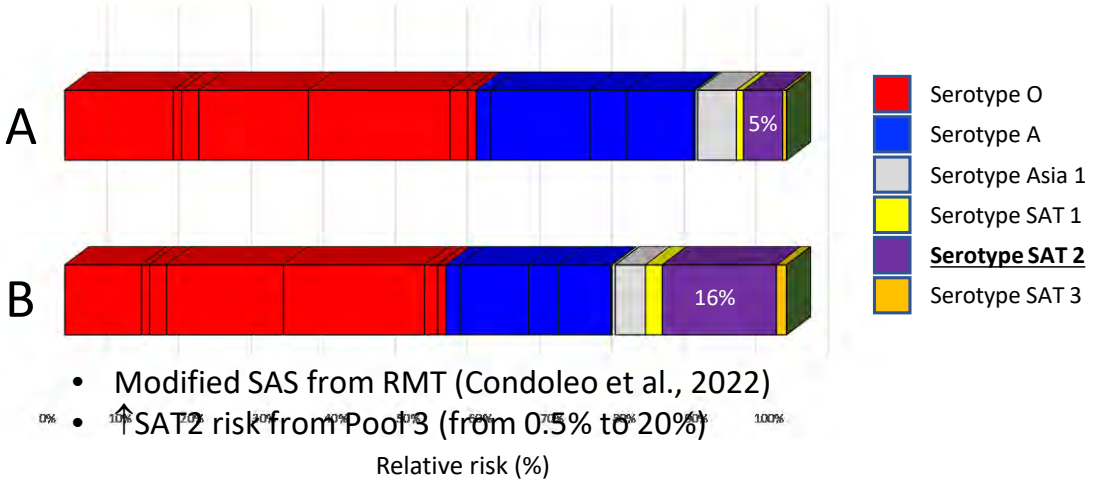
Annex 3: Vaccine recommendations

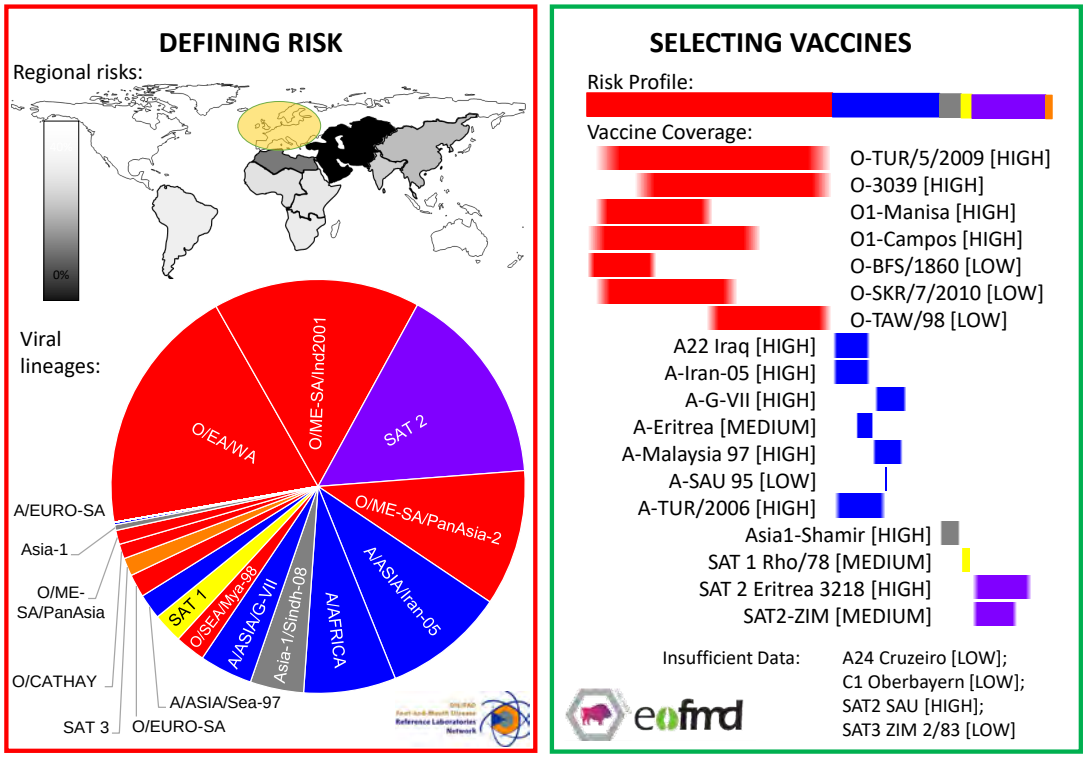
This report provides recommendations of FMDV vaccines to be included in antigen banks. These outputs are generated with a new tool (called PRAGMATIST) that has been developed in partnership between WRLFMD and EuFMD (http://www.fao.org/3/cb1799en/cb1799en.pdf). These analyses accommodate the latest epidemiological data collected by the WOAH/FAO FMD reference laboratory network regarding FMDV lineages that are present in different *source regions* (see Table 1 in Section 3.9, above), as well as available *in vitro, in vivo* and field data to score the ability of vaccines to protect against these FMDV lineages.

FMD risk profiles for Europe: October 2023:

NB: The two outputs below define FMD risks for Europe which reflect the on-going situation in Pool 3 where FMD cases due to SAT2/XIV have been reported in three countries (Iraq, Jordan and Türkiye). These outputs use Score Area Scores from PRAGMATIST that have been parameterised with data from the FMD EURL meeting in 2017 (A) or the approach describe by Condoleo *et al.*, 2022). The PRAGMATIST figure (below) uses the worst case SAT2 scenario.



- Modified SAS from RMT (Condoleo et al., 2022)
- ↑SAT2 risk from Pool 3 (from 0.5% to 20%)



NB: Analyses uses best available data, however there are gaps in surveillance and vaccine coverage data

Please contact WRLFMD or EuFMD for assistance to tailor these outputs to other geographical regions. NB: Vaccine-coverage data presented is based on available data and may under-represent the true performance of individual vaccines.

Further information about the PRAGMATIST system has been published recently in *Frontiers in Veterinary Science* - see: https://doi.org/10.3389/fvets.2022.1029075.

Condoleo *et al.*, 2022: Risk monitoring tool for FAST diseases (RMT-FAST): a semi-quantitative framework to estimate the risk of disease introduction. EuFMS Open Session, Marseille. (https://www.eufmd.info/os22)

Annex 4: Brief round-up of EuFMD and WRLFMD activities

Courses

- The WRLFMD will host a two-week practical training course in FMD Diagnostic methods (https://www.pirbright.ac.uk/instructor-led-training/diagnosis-foot-and-mouth-disease) during May 2024.
- A second practical course will be offered at Pirbright during May 2024 to cover FMD post-vaccination monitoring through VNT and ELISA (https://www.pirbright.ac.uk/instructor-led-training/fmd-post-vaccination-monitoring-through-vnt-and-elisa).
- The EuFMD's open-access Courses provide convenient self-paced training which you may study anytime, anywhere, free of charge. There are currently 8 courses in English and 1 in Arabic:
  - **Introduction to Foot-and-Mouth Disease** (available in English and French), introducing foot-and-mouth disease (FMD), its importance, diagnosis, outbreak investigation and the control measures that might apply in a previously free country experiencing an outbreak.
  - **Introduction to Lumpy Skin Disease**, a short open-access module made available to support countries in Asia and the Pacific facing this rapidly emerging threat.
  - **Introduction to Rift Valley Fever** aims to build your understanding of Rift Valley fever diagnosis, surveillance, prevention and control.
  - **What is the Progressive Control Pathway** (available in English and, for anyone who is new to the PCP-FMD, a short e-learning module is also available in Arabic) providing an overview of the Progressive Control Pathway for Foot-and-Mouth Disease (PCP-FMD), the tool used to FMD control under the GF-TADs Global Strategy.
  - **Introduction to the Risk-Based Strategic Plan** introducing the Risk-Based Strategic Plan (RBSP).
- **Public Private Partnerships in the Veterinary Domain** course, developed in partnership with the World Organisation for Animal Health (WOAH), applying public-private partnerships to the control of FMD and similar transboundary animal diseases.
- **Simulation Exercises for Animal Disease Emergencies** (available through FAO eLearning academy) aiming at building your understanding of simulation exercises and their value as part of the emergency preparedness cycle.
- A course on **Introduction to the FMD Minimum Biorisk Management Standards** is currently in development. The virtual course will be open access, will target National Competent Authorities, Institute directors for FMD facilities, biorisk managers and laboratory personnel in laboratories handling infectious FMD. The learning objectives will include introduce the importance, implications and responsibilities of implementing the FMD Minimum Biorisk Management Standards.
- **Real Time Training in Kenya Induction Course (NTC 33)** from 7 to 10 November in Nakuru, Kenya.
- **Real Time Training in Kenya Induction Course (RTC 2)** from 13 to 15 November in Nakuru, Kenya.

Podcasts

We have a constantly updated series of short podcasts relating to the FAST world (http://www.fao.org/eufmd/resources/podcasts/en/).

- A series of videos on foot-and-mouth disease in English, Bulgarian, Greek and Turkish (https://www.fao.org/eufmd/en/).
- Leaflets on FMD in English, Turkish, Bulgarian and Greek, for the Thrace region (https://www.fao.org/publications/card/en/c/CB4903EN).
- Join our Telegram channel to receive EuFMD updates (https://t.me/eufmd).
- Find out who TOM is and why you need him (https://www.eufmd.info/tom-training).

Emergency Preparedness Network (http://www.fao.org/eufmd/network/en/)

The Emergency Preparedness Network is a forum for emergency preparedness experts to share information and experience. You will regularly receive the latest information on topics related to prevention and control of foot-and-mouth and other similar transboundary animal diseases ("FAST" diseases).

Meetings

- **Quadripartite Meeting between the Veterinary Services of Türkiye, Islamic Republic of Iran, Pakistan, Iraq and the European Commission for the Control of Foot-and-Mouth Disease** – 14 November 2023
- **Risk mapping for early detection and control of foot-and-mouth and other similar transboundary animal diseases (FAST) in North Africa** – from 20 November to 22 December 2023.
- **Online Coordination meeting: FAST disease programmes in the European neighbourhood and West Eurasian region - EuFMD, FAO SEC, FAO REU and WOAH** – 21 November 2023.

Proficiency test scheme organised by WRLFMD

Sample panels are being dispatched for a new PTS (Phase XXXV, supported with funding from EuFMD and UK Defra). Any interested laboratories should contract the WRLFMD for further information. The progress of this PTS will be described in future quarterly reports.