Food and Agriculture Organization of the United Nations

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

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

FMD 2024 OCT NOV DEC Quarterly Report

2024 Foot-and-mouth disease quarterly report
October-November-December

European Commission for the Control of Foot-and-Mouth Disease

2023-2027 Strategy
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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

A "Happy New Year" to our readers! During this quarter, the WRLFMD has reported vaccine matching data for samples received from Indonesia and for South American field isolates received from PANAFTOSA, Brazil. New VP1 sequences have also been received from Iran (from GenBank), Palestinian AT (Ministry of Agriculture Veterinary Services and Animal Health) and Türkiye (Şap Enstitüsü, Türkiye). Interestingly, sequences from all three of these countries represent FMD outbreaks due to O/ME-SA/SA-2018, an emerging lineage which is normally found in FMD endemic Pool 2. History tells us that FMD virus lineages that become established in Pool 2 often spread beyond this region to cause outbreaks in other locations. Over the past 5 years, the O/ME-SA/SA-2018 lineage has become increasingly dominant in India to now represent approximately 40% of all serotype O FMD cases. Since 2021, we have been tracking the spread of this lineage beyond the Indian sub-continent where is has previously caused outbreaks in UAE and Oman. The sequences from the Palestinian AT are in a separate clade to those collected in Iran and Türkiye suggesting that there has been more than one recent incursion of this lineage from South Asia.

In North Africa, the have been new reports of SAT 2 outbreaks in Algeria (that occurred earlier in 2024) as well as further evidence for the circulation of the O/EA-3 topotype in Libya. In South Africa, new FMD outbreaks (due to serotype SAT 2 in Kwazulu-Natal and SAT 3 in the Eastern Cape) have been reported to WAHIS during this quarter. In Indonesia, there has been an upsurge of FMD outbreaks due to the O/ME-SA/Ind-2001e lineage and in China new FMD outbreaks have been reported to WAHIS.

This report describes FMD outbreaks in several countries where serotyping information is not recorded. I recommend that representative samples are sent to the WRLFMD or another laboratory in the WOAH/FAO FMD Laboratory Network to fully characterise the causative viruses and to ensure that appropriate vaccines are used (shipping costs can be covered for these samples – please contact me for further details)

STOP PRESS: An FMD outbreak in group of water buffalo was reported by the German authorities to WAHIS on 10th January 2025. This outbreak represents the first case of FMD in the EU since 2010/11 when outbreaks occurred in Bulgaria. Sequence data characterises the causative virus as serotype O (O/ME-SA/SA-2018 lineage). This unexpected event highlights the ease by which FMDV can cross international boundaries and re-emphasizes the importance of sharing the latest information regarding FMD outbreaks, and maintaining surveillance and diagnostic capability that can promptly follow up any suspect cases of vesicular disease. Further information on this case will be provided in the next report.

Don King, Pirbright, January 2025

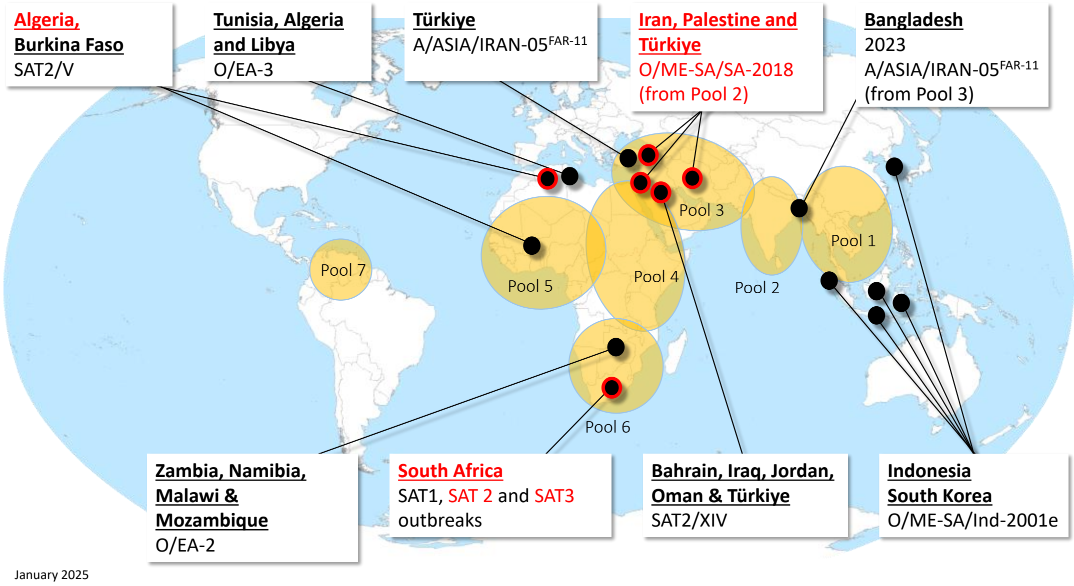


Figure 1: Recent FMD outbreaks with global epidemiological significance.

Note: New headline events reported July to September 2024 are highlighted in red with FMD 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 these pools 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, (Mauritius[1]), 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, while cases due to serotype SAT 3 (reported in 2024) highlight the connectivity to Pool 6.

[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.

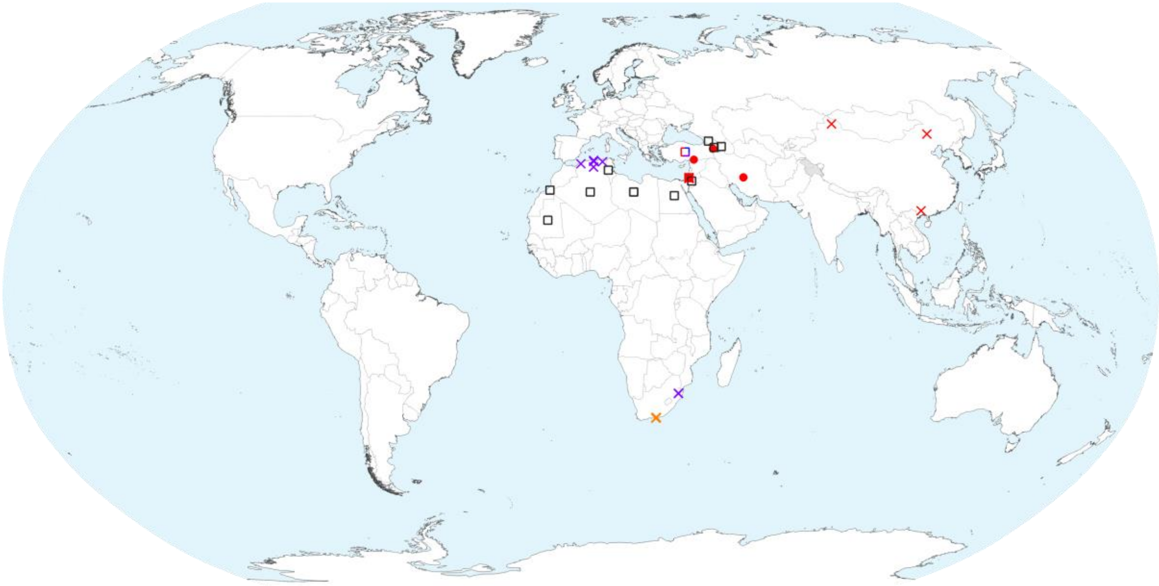


Figure 2: Samples tested by WRLFMD or reported in this quarter. ● indicates samples analysed; × indicates outbreaks reported/updated to the WOAH this quarter; □ indicates reports of FMD from other sources. Shape colours define the serotype detected ●O; ●A; ●C; ●Asia1, ●SAT1, ●SAT2, ●SAT3, ● serotype undetermined/not given in the report, ○ FMD not detected.

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

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

The People's Republic of China

On 14 October 2024, 7 cases of **FMD type O** in cattle were reported via WAHIS from Bairin Left Banner, Chifeng City, Nei Mongol

WAHIS event ID: 5911

On 8 November 2024, 10 cases of **FMD type O** in swine were reported via WAHIS from Nanning, Guangxi Zhuang Autonomous Region

WAHIS Event ID: 5999

On 30 December 2024, 2 cases of **FMD type O** in cattle were reported via WAHIS from Fuhai County, Altay Prefecture, Xinjiang Uygur Autonomous Region.

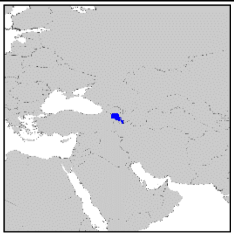
WAHIS Event ID: 6114

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



Passive and active surveillance for FMD is used in Armenia. During this quarter, over 1.5 million large ruminants and 5 million small ruminants have been vaccinated.

EuFMD FAST Report

The Republic of Azerbaijan

During October to December, >1.5 million cattle and 5 million small ruminants were vaccinated. Active and passive surveillance is in place to monitor for outbreaks of FMD.

EuFMD FAST Report

Georgia

SP and NSP sero-surveys for FMD have been completed this quarter. Positive results were generated for 78% of samples tested for SP-specific antibodies and 5% of samples tested for NSP-specific antibodies.
Over half a million animals (>265,000 large ruminants and >250,000 small ruminants) have been vaccinated against FMD this quarter.

EuFMD FAST Report

The Hashemite Kingdom of Jordan

Passive surveillance and a pilot initiative for syndromic surveillance for FMD is occurring. A vaccination campaign is in progress, with almost 6,000 large ruminants and more than 68,000 small ruminants vaccinated against FMD serotypes O, A and SAT 2 this quarter.

EuFMD FAST Report

Palestine

In November 2024 **FMD type O** was reported from AL Tybeh (130 cases in sheep) & Silwad (12 cases in sheep) in Ramallah and Al-Bireh, West Bank via WAHIS. On 3 December 2024 a futher 132 cases in Sheep and 1 case in a goat from Hindaza, Bethlehem, West Bank was reported.

WAHIS event ID: 6024

Three outbreaks of FMD serotype O were reported this quarter. Ring vaccination has been implemented around the outbreaks and a vaccination campaign in the West Bank has commenced.

EuFMD FAST Report

A VP1 sequence generated by KVI, Israel was submitted to the WRLFMD (on behalf of Ministry of Agriculture Veterinary Services and Animal Health) on the 17th November associated with an FMD outbreak in Ramallah District, West Bank. This sequence was genotyped as a member of the O/ME-SA/SA-2018 lineage (see below).

Türkiye

The Autumn vaccination campaign was completed in mid-November using a tetravalent vaccine (O, A, Asia-1 and SAT 2). Combined with the Early Spring and Spring campaigns, this achieved more than 90% coverage.
The routine risk-based surveillance plan in Thrace is active. Three animal movement checkpoints have been set up and sera collected at these points from randomly selected animals is being tested by SP and NSP ELISA.

EuFMD FAST Report

Two VP1 sequences generated by the Şap Enstitüsü (Ankara) were submitted to the WRLFMD on the 18^{th} December 2025. One of these sequences genotyped as a member of the O/ME-SA/SA-2018 lineage, while the other was O/ME-SA/PanAsia-2^{ANT-10} (see below).

3.5. Pool 4 (North and Eastern Africa)

The People's Democratic Republic of Algeria

Further **FMD type SAT 2** cases (39 cases in cattle) from outbreaks occurring in December 2023 and January 2024 were reported on WAHIS during November 2024.

WAHIS event ID: 5391

Nine outbreaks across 6 wilayas have been reported this quarter.
Various control measures have been implemented in response and passive, active and targeted clinical surveillance is in place to detect further outbreaks. Vaccination campaigns started earlier in the year (using a monovalent SAT 2 and bivalent O & A vaccines) have reached about 70% coverage.

EuFMD FAST Report

The Arab Republic of Egypt

More than 200,000 cows, buffaloes, sheep and goats have been examined as part of clinical surveillance in the country. No clinical symptoms have been detected. Over 3 million annimals have been vaccinated.

EuFMD FAST Report

The State of Libya

In late October, local media reported the spread of **FMD** in Libya. With UN support, emergency vaccination plans have been rolled out. A main cause of these outbreaks is supected to be illegal importation with under reporting of cases exacerbating the situation.

ProMED post: 20241027.8719633

Passive and active surveillance is active in the country. More than 800 samples collected for the active surveillance are currently being tested by NSP ELISA.

EuFMD FAST Report

The Islamic Republic of Mauritania

21 outbreaks (untyped) from the Hodh Ech Chargui and Hodh El Gharbi regions have been reported during the last 12 months. Passive surveillance is used for FMD in the country.

EuFMD FAST Report

The Kingdom of Morocco

Passive and active surveillance is in use in the country. Large ruminants are vaccinated twice a year, small ruminants once a year, using a bivalent vaccine containing serotypes O and A and a monovalent SAT 2 vaccine.

EuFMD FAST Report

The Republic of Tunisia

Twenty seven outbreaks (untyped) across 14 governates were reported during the last 12 months. Passive surveillance is in use in the country.

EuFMD FAST Report

3.6. Pool 5 (West/Central Africa)

No new outbreaks of FMD were reported in West or Central Africa.

3.7. Pool 6 (Southern Africa)

The Republic of South Africa

12 **FMD type SAT 2** cases in cattle were reported via WAHIS from locations in UPhongolo, Zululand, Kwazulu-Natal during November 2024 as part of the on-going SAT 2 outbreak.

WAHIS event ID: 3738

658 **FMD type SAT 3** cases in cattle were reported via WAHIS from locations in Kouga, Sarah Baartman, Eastern Cape on 25 October 2024 as part of the on-going SAT 3 outbreak.

WAHIS event ID: 5658

3.8. Pool 7 (South America)

No new outbreaks of FMD were reported in South America.

3.9. Extent of global surveillance

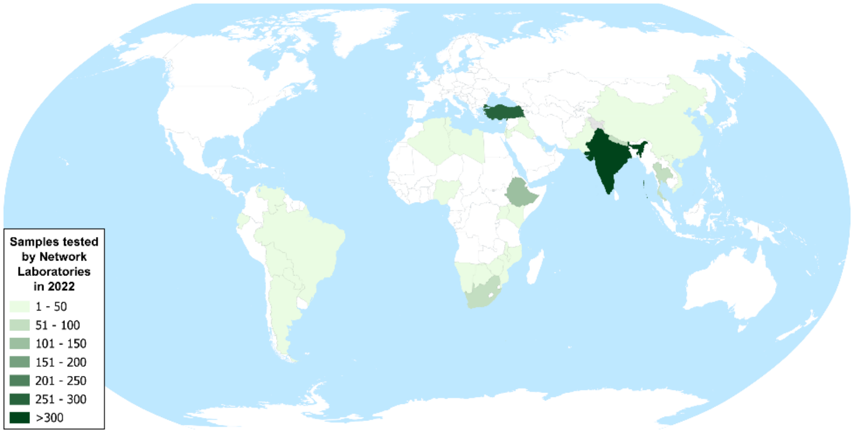


Figure 3: Samples received during 2023 from FMD outbreaks (routine surveillance that is undertaken in countries that are FMD-free without vaccination is not shown). Data (updated where appropriate) from presentations given at the WOAH/FAO FMD reference laboratory network annual meeting (https://www.foot-and-mouth.org/Ref-Lab-Network/Network-Annual-Meeting).
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).

Table 1: Conjectured relative prevalence of circulating FMD viral lineages in each Pool (last updated October 2023). These scores can be used to inform the PRAGMATIST tool (see Annex 3:).

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			**30**					
O ME-SA PanAsia	10							
O SEA Mya-98	**21.5**							
O ME-SA Ind2001	**40**	**76[1]**	**5.5[1]**	**0**				
O EA or O WA			**1.5**	**60**	**53.5**	**69**	16	
O EURO-SA								**90**
O CATHAY	10.5							
A ASIA Sea-97	**18**							
A ASIA Iran-05	0		**28**					
A ASIA G-VII		**20**	**5**					
A AFRICA				**30**	**17**	**15**		
A EURO-SA								**10**
Asia1	**0**	4	**10**					
SAT 1			**1**	0	**15**	**1**	**16**	
SAT 2			**19**	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 Pools 2 and 3.

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 are reviewed at the annual WOAH/FAO FMD reference laboratory network meeting. Changes to increase risks are shown in **red**, while a reduction in risk is shown in **green**. A further update will be provided in the next report using the data presented at the WOAH/FAO FMD Reference Laboratory Network meeting in September 2024 (currently being reviewed by the Network partners).

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-2024.

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 October - December 2024 is shown in Annex 1: (Summary of submissions). A record of all samples received by WRLFMD is shown in Annex 1: (Clinical samples).

Table 2: Status of sequencing of samples or sequences received by the WRLFMD from October - December 2024.

WRLFMD Batch No.	Date received	Country	Total No. samples	Serotype	No. of samples	No. of sequences	Sequencing status
-	-	-	-	-	-	-	-
Totals			**0**		**0**	**0**	

Table 3: VP1 sequences submitted by other FMD laboratories to the WRLFMD from October - December 2024.

WRLFMD Batch No.	Date received	Country	Serotype	Date Collected	No. of sequences	Submitting laboratory
WRLMEG/2024/000013	11/11/2024	Iran	O	2023	1	GenBank
WRLMEG/2024/000014	17/11/2024	Palestine	O	2024	1	Ministry of Agriculture Veterinary Services & Animal Health
WRLMEG/2024/000017	18/12/2024	Türkiye	O	2024	2	Şap Enstitüsü
				Total	**9**	

4. Detailed analysis

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

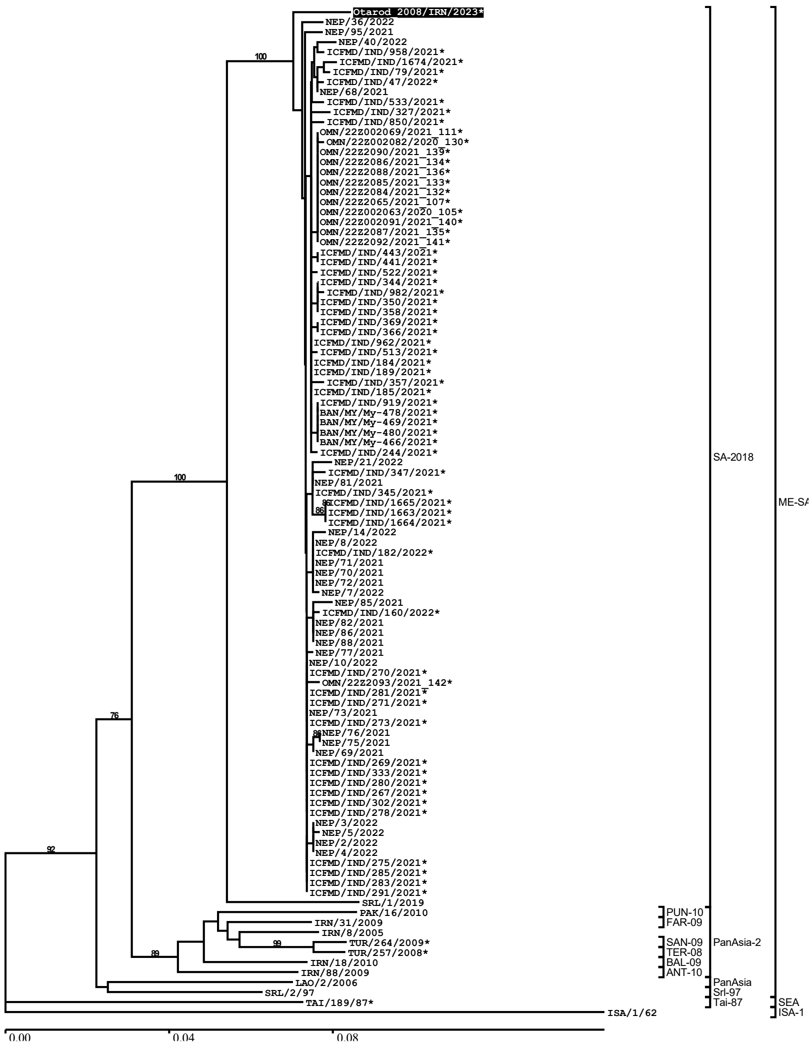
No samples/sequences received.

4.2. Pool 2 (South Asia)

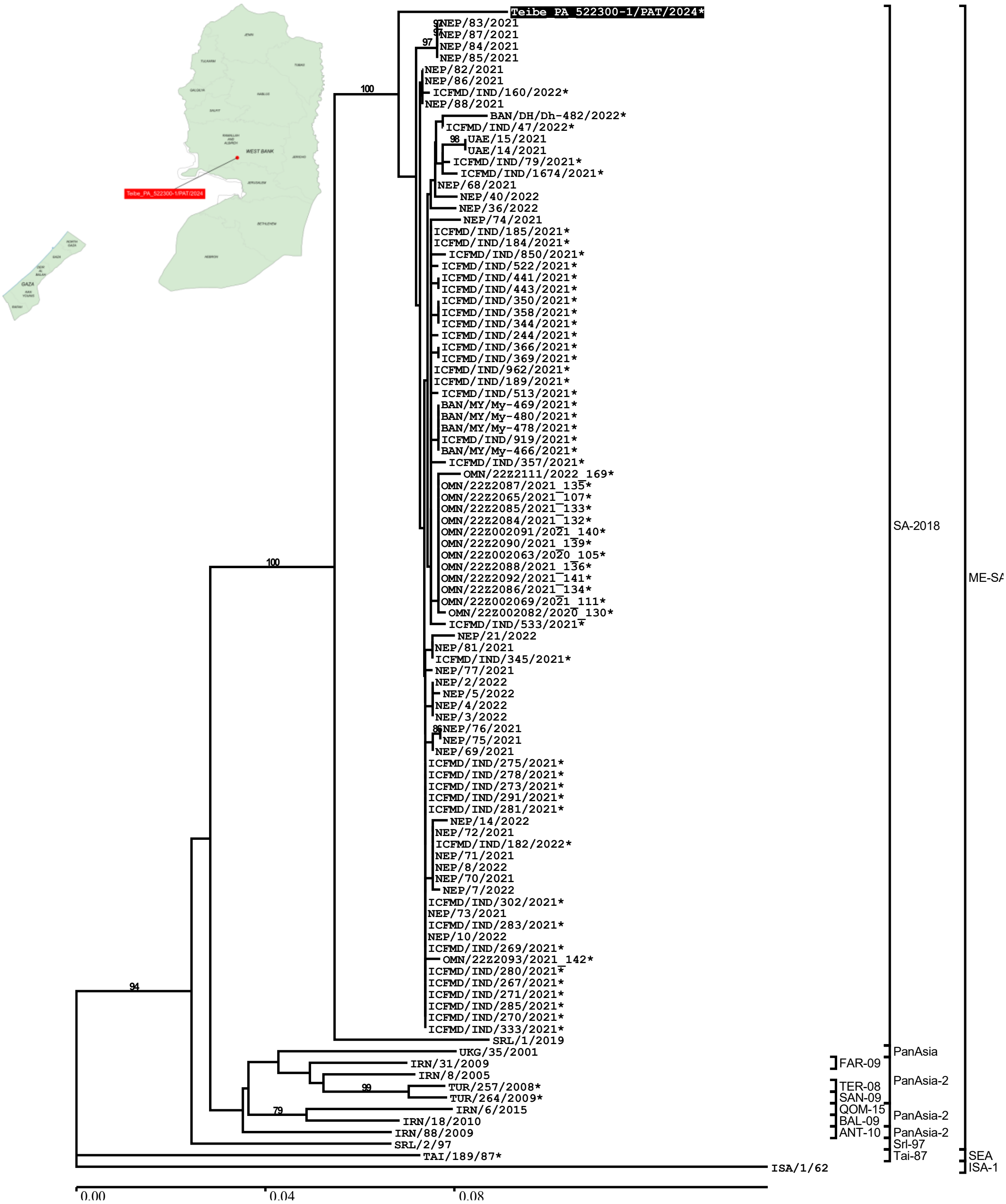
No samples/sequences received.

4.3. Pool 3 (West Eurasia and Near East)

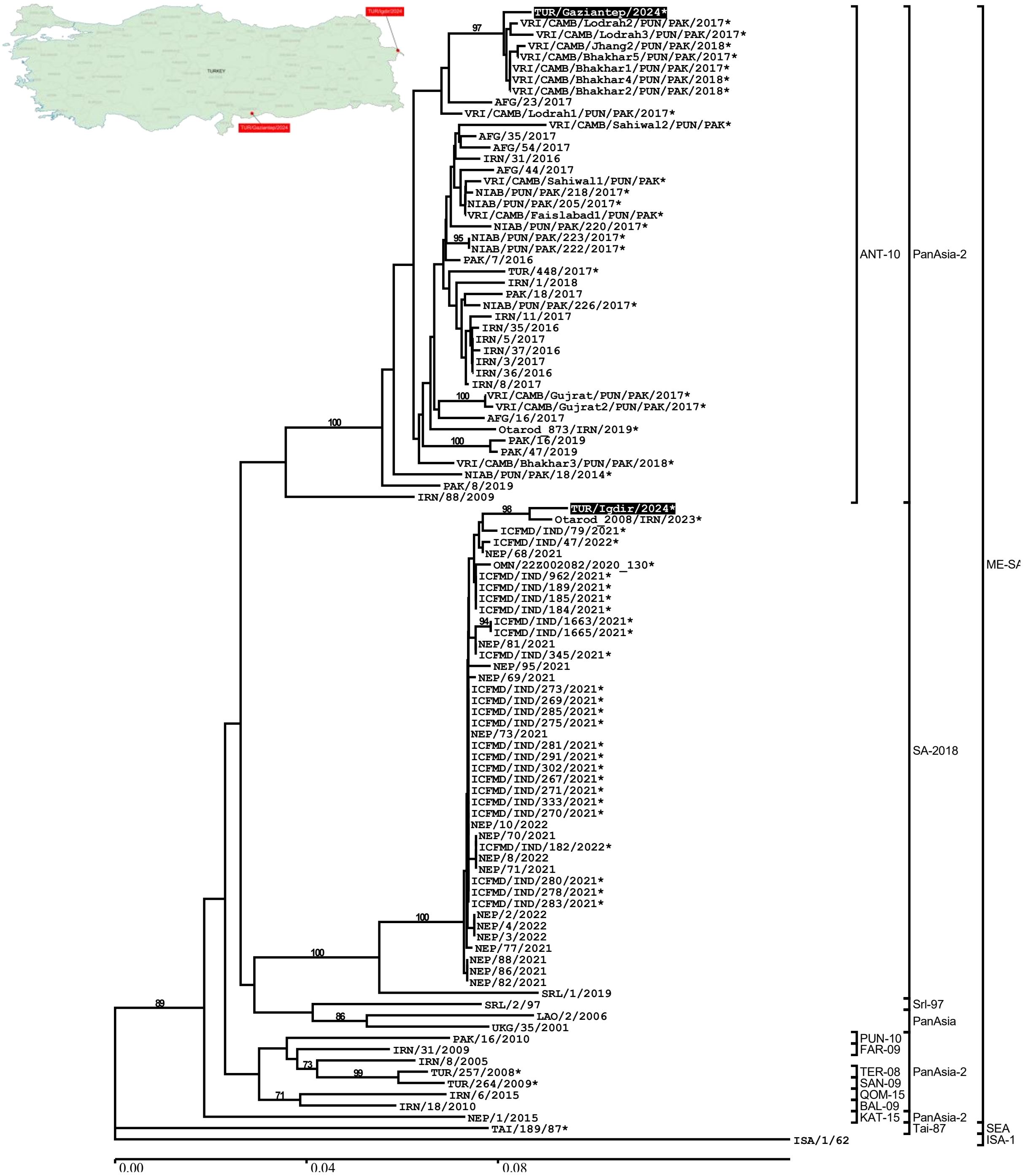
The Islamic Republic of Iran	
Batch (no location provided):	WRLMEG/2024/000013
Samples/sequences provided by:	Retrieved from GenBank
Date Received:	11 November 2024
Number Of Samples:	1
O (O/ME-SA/SA-2018)	1



Palestine	
Batch:	WRLMEG/2024/000014
Samples/sequences provided by:	Ministry of Agriculture Veterinary Services & Animal Health
Date Received:	17 November 2024
Number Of Samples:	1
O (O/ME-SA/SA-2018)	1



The Republic of Türkiye	
Batch:	WRLMEG/2024/000017
Samples/sequences provided by:	Şap Enstitüsü
Date Received:	18 December 2024
Number Of Samples:	2
O (O/ME-SA/SA-2018)	1
O (O/ME-SA/PanAsia-2^{ANT-10})	1



4.4. Pool 4 (North and East Africa)

No samples/sequences received.

4.5. Pool 5 (West/Central Africa)

No samples/sequences received.

4.6. Pool 6 (Southern Africa)

No samples/sequences received.

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 October - December 2024.

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	Asia 1	SAT 1	SAT 2	SAT 3
Argentina *	-	3	-	-	-	-	-
Bahrain	-	1	-	-	-	-	-
Bolivia *	-	1	-	-	-	-	-
Brazil *	-	1	-	-	-	-	-
Columbia *	-	1	-	-	-	-	-
Egypt	-	1	-	-	-	-	-
Indonesia	3	-	-	-	-	-	-

Serotype	O	A	C	Asia 1	SAT 1	SAT 2	SAT 3
Iran	-	2	-	-	-	-	-
Kenya	-	1	-	-	-	-	-
Nepal	-	1	-	-	-	-	-
Nigeria	-	1	-	-	-	-	-
Pakistan	-	1	-	-	-	-	-
Sudan	-	1	-	-	-	-	-
Thailand	-	2	-	-	-	-	-
Uruguay *	-	2	-	-	-	-	-
Venezuela *	-	2	-	-	-	-	-
Total	**3**	**21**	**0**	**0**	**0**	**0**	**0**

* Note: the samples received from South American countries are from historical, and not current, outbreaks.

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 = $\geq$ 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

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*	
Isolate	Topotype	Lineage	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*
ISA 8/2022	ME-SA	Ind-2001	0.37	*1.61*	0.25	*1.86*	0.48	*2.33*	0.86	*2.30*	0.46	*1.99*	0.47	*2.01*
ISA 8/2023	ME-SA	Ind-2001	0.54	*1.77*	0.22	*1.81*	0.58	*2.41*	0.93	*2.34*	0.45	*1.98*	0.57	*2.09*
ISA 11/2024	ME-SA	Ind-2001	0.49	*1.73*	0.27	*1.89*	0.68	*2.48*	0.76	*2.25*	0.50	*2.03*	0.61	*2.12*

Table 6: Vaccine matching studies for A FMDV

[Results for A Eritrea 98, A GVII 2015 , A Iran 05, A Malaysia 97, A Saudi 95, A/TUR/20/06 & A22 Iraq were reported in previous quarterly reports – shown here in grey text]

Serotype A			A Eritrea 98 *Boehringer Ingelheim*		A GVII 2015 *Boehringer Ingelheim*		A Iran 05 *Boehringer Ingelheim*		A Malaysia 97 *Boehringer Ingelheim*		A Saudi 95 *Boehringer Ingelheim*		A/TUR/20/06 *MSD Animal Health*		A22 Iraq *Boehringer Ingelheim*		A2001 Argentina *Biogénesis Bagó*		A24 Cruzeiro *Biogénesis Bagó*	
Isolate	Topotype	Lineage	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*	r_1	*titre*
IRN 22/2021	ASIA	Iran-05	NT	-	0	-	0.28	*2.05*	NT	-	NT	-	0.36	*1.44*	0.32	*2.17*	0.47	*2.74*	0.15	*2.10*
PAK 5/2023	ASIA	Iran-05	NT	-	0.14	*1.08*	0.23	*1.91*	0.11	*1.59*	NT	-	0.25	*1.83*	0.20	*1.96*	0.44	*2.80*	0.11	*1.94*
TAI 5/2021	ASIA	Sea-97	NT	-	0.46	*1.49*	0.07	*1.48*	0.33	*1.82*	NT	-	0.11	*0.90*	0.39	*1.94*	0.84	*2.99*	0.08	*1.79*
TAI 14/2022	ASIA	Sea-97	NT	-	0.71	*1.87*	0.17	*1.76*	0.66	*2.23*	NT	-	0.29	*1.89*	0.28	*2.00*	0.53	*2.79*	0.07	*1.76*
IRN 25/2018	ASIA	G-VII	NT	-	0.71	-	0.01	-	NT	-	NT	-	0.01	-	0.14	-	0.39	*2.66*	0.07	*1.83*
NEP 5/2021	ASIA	G-VII	NT	-	0.2	*1.47*	NT	-	0.15	*1.77*	NT	-	0.41	*1.72*	0.38	*2.28*	0.34	*2.60*	0.15	*2.15*
BAR 21/2021	AFRICA	G-I	0.12	*1.69*	0.39	*1.58*	0.00	*0.00*	NT	-	0.35	*1.98*	0.00	*0.00*	0.31	*1.94*	0.72	*2.93*	0.07	*1.82*
KEN 6/2023	AFRICA	G-I	0.08	*1.54*	0.36	*1.50*	0.16	*1.80*	NT	-	0.08	*1.41*	0.06	*1.15*	0.33	*1.96*	0.33	*2.58*	0.06	*1.72*
EGY 1/2022	AFRICA	G-IV	0.16	*1.86*	0.01	*0.14*	0.22	*1.98*	NT	-	0.03	*0.92*	0.03	*1.03*	0.13	*1.86*	0.34	*2.69*	0.27	*2.45*
NIG 16/2020	AFRICA	G-IV	0.43	*2.42*	0.19	*1.35*	NT	-	NT	-	0.51	*2.19*	0.09	*1.04*	0.55	*2.34*	0.41	*2.68*	0.13	*2.09*
SUD 2/2022	AFRICA	G-IV	0.13	*1.78*	0.00	*0.00*	0.37	*2.05*	NT	-	0.33	*1.89*	0.01	*0.21*	0.14	*1.84*	0.31	*2.51*	0.16	*2.23*
ARG 5/2000*	EURO-SA	-	0.09	*1.51*	0.00	*0.00*	0.05	*1.15*	0.11	*1.46*	0.13	*1.35*	0.07	*1.16*	0.05	*1*	0.76	*2.88*	0.16	*2.07*
ARG 8/2001*	EURO-SA	-	0.27	*1.97*	0.43	*1.57*	0.05	*1.35*	0.22	*1.84*	0.00	*0.00*	0.00	*0.00*	0.07	*1.39*	1	*3.27*	0.17	*2.12*
ARG 9/2001*	EURO-SA	-	0.12	*1.69*	0.30	*1.45*	0.05	*1.27*	0.24	*1.80*	0.00	*0.00*	0.11	*1.48*	0.07	*1.35*	1	*3.1*	0.09	*1.85*
BOL 2/1997*	EURO-SA	-	0.16	*1.77*	0.23	*1.08*	0.10	*1.50*	0.24	*1.84*	0.17	*1.48*	0.17	*1.57*	0.08	*1.24*	1	*3.14*	0.15	*2.05*
BRA 1/1997*	EURO-SA	-	0.24	*2.18*	0.92	*1.94*	0.11	*1.78*	0.22	*1.81*	0.10	*1.64*	0.18	*1.91*	0.08	*1.39*	1	*3.09*	0.16	*2.09*
COL 1/1996*	EURO-SA	-	0.15	*1.97*	0.43	*1.60*	0.61	*2.42*	0.15	*1.65*	0.25	*2.04*	0.10	*1.67*	0.71	*2.3*	0.4	*2.6*	0.13	*2.00*
URU 2/2001*	EURO-SA	-	0.14	*1.70*	0.45	*1.57*	0.04	*1.29*	0.17	*1.73*	0.12	*1.48*	0.21	*1.64*	0.05	*1.28*	1	*3.02*	0.12	*1.95*
URU 3/2001*	EURO-SA	-	0.09	*1.56*	0.39	*1.57*	0.05	*1.19*	0.21	*1.79*	0.00	*0.00*	0.18	*1.67*	0.04	*1.11*	1	*3.15*	0.12	*1.96*
VEN 1/2013*	EURO-SA	-	0.31	*1.98*	0.00	*0.00*	0.10	*1.36*	0.16	*1.67*	0.00	*0.00*	0.04	*1.18*	0.08	*1.5*	0.54	*2.73*	0.06	*1.64*
VEN 2/2013*	EURO-SA	-	0.39	*2.05*	0.37	*1.58*	0.12	*1.59*	0.12	*1.59*	0.11	*1.37*	0.12	*1.52*	0.15	*1.76*	0.57	*2.75*	0.09	*1.84*

* Note: the samples received from South American countries are from historical, and not current, outbreaks.

Annex 1: Sample data

Summary of submissions

Table 7: Summary of samples collected and received to WRLFMD October - December 2024

Country	№ of samples	Virus isolation in cell culture/ELISA								RT-PCR for FMD	
		FMD virus serotypes							No Virus		
		O	*A*	*C*	*SAT 1*	*SAT 2*	*SAT 3*	*ASIA1*		*Positive*	*Negative*
-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Clinical samples

Table 8: Clinical sample diagnostics made by the WRLFMD October - December 2024

Country	Date		WRL for FMD Sample Identification	Animal	Date of Collection	Results		
	Received	Reported				VI/ELISA	RT-PCR	Final report
-	-	-	-	-	-	-	-	-
TOTAL			**0**					

Annex 2: FMD publications

Recent FMD Publications October - December 2024 cited by Web of Science.

1. Asadbeigi, A., M.R. Bakhtiarizadeh, M. Saffari, M.H. Modarressi, N. Sadri, Z.Z. Kafi, H. Fazilaty, A. Ghalyanchilangeroudi, and H. Esmaeili (2024). Protection of animals against devastating RNA viruses using CRISPR-Cas13s. *Molecular Therapy Nucleic Acids*, **35**(3): 13. DOI: 10.1016/j.omtn.2024.102235.
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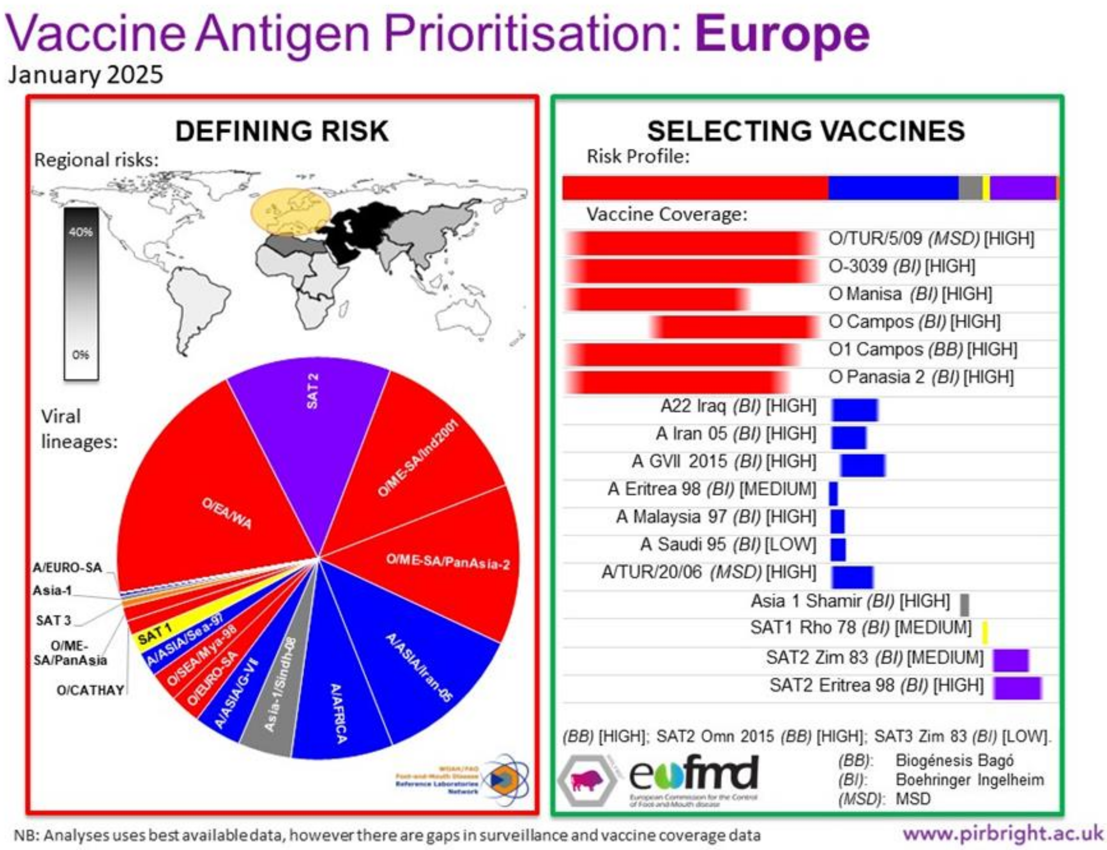
Annex 3: Vaccine recommendations

This report provides recommendations of FMDV vaccines to be included in antigen banks. These outputs are generated with a 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.



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 in *Frontiers in Veterinary Science* - see: https://doi.org/10.3389/fvets.2022.1029075.

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

Courses & Training

- The EuFMD's open-access Courses provide convenient self-paced training which you may study anytime, anywhere, free of charge:
  - **Introduction to Foot-and-Mouth Disease** (*also available in French*); Provides an overview of FMD, recognition of suspect disease in the field, correct sampling of cases and the relevant control measures.
  - **Introduction to the socioeconomics of foot-and-mouth and similar transboundary animal diseases**; the socioeconomics of FMD and similar transboundary (FAST) animal diseases.
  - **Introduction to sheep pox and goat pox**; Provides an overview of sheep pox and goat pox, recognise or suspect the disease in the field, identify the correct samples to collect and the relevant control measures.
  - **Introduction to Lumpy Skin Disease** (*also available in French*), This online module has been made available to support animal health practitioners in countries that are currently affected by, or at risk of lumpy skin disease (LSD).
  - **Introduction to Rift Valley Fever** (*also available in French*); Build your understanding of Rift Valley fever diagnosis, surveillance, prevention and control. This course is intended to be of interest to veterinarians and veterinary para-professionals working in countries that are at risk of Rift Valley Fever epizootics.
  - **Introduction to Animal Health Surveillance**; Provides an overview of the importance and key activities of surveillance within the overall context of animal health. It also forms the basis for further, in-depth courses on passive surveillance.
  - **What is the Progressive Control Pathway?** (*also available in Arabic*); Provides an overview of the Progressive Control Pathway for Foot-and-Mouth Disease (PCP-FMD). This introduction will be interesting for anyone who is new to the PCP-FMD, and who would like a rapid guide to its key features.
  - **Introduction to the Risk Assessment Plan** (*also available in French*); The course consists of five self-directed online modules. These modules describe the purpose of the Risk Assessment Plan, give guidance on how to develop a risk assessment plan and explain they key content that should be included within each chapter of the Risk Assessment Plan document.
  - **Introduction to the Risk-Based Strategic Plan**; The course consists of six self-directed online modules. These modules describe the purpose of the Risk-Based Strategic Plan, give guidance on how to develop a risk-based control strategy and explain they key content that should be included within each chapter of the Risk-Based Strategic Plan document.
  - **Introduction to the Official Control Programme**; The course consists of six self-directed online modules. These modules describe the purpose of the OCP, give guidance on how to develop an OCP and explain they key content that should be included within each chapter of the OCP document.

    - **Introduction to the FMD Minimum Biorisk Management Standards**; Provides an overview of the Minimum Biorisk Management Standards for foot-and-mouth disease laboratories (MBRMS), explaining the scope and the risks associated with the standards.
- **NTC35 - Real-Time training** from 25 to 28 February in Nakuru, Kenya.

Meetings

- **105th Executive Committee of the EuFMD** - 12 March 2025
- **46th General Session of the EuFMD** - 6 to 7 May 2025

Other sources of information from EuFMD

- EuFMD webpages (https://www.fao.org/eufmd/).
- EuFMD has a constantly updated series of short podcasts relating to the FAST world (http://www.fao.org/eufmd/resources/podcasts/).
- Leaflets on FMD in Arabic, Bosnian, Bulgarian, English, Greek and Montenegrin for the Thrace region (https://www.fao.org/publications/card/en/c/CB4903EN).
- Join the EUFMD Telegram channel to receive EuFMD updates (https://t.me/eufmd).

Proficiency test scheme organised by WRLFMD

A report for the FMD PTS (Phase XXXV, supported with funding from EuFMD and UK Defra) has been finalised and been distributed to all participants and EuFMD. The sample panels for the FMD PTS Phase XXXVI will be shipped to laboratories shortly.

FAO four betters. Better life, better environment, better nutrition, better production.

EuFMD's programme, tools and initiatives

FAST
Foot-and-mouth And Similar Transboundary animal diseases

Dt
EuFMD digital transformation

Tom
EuFMD training management system

Microlearning
EuFMD micro learning

Vlearning
EuFMD virtual learning

Sim Ex On
Simulation exercises online

Get prepared
Emergency preparedness toolbox

Risk Comms
EuFMD risk communications

RMT-FAST
Risk monitoring tool for foot-and-mouth and similar transboundary animal diseases

Pragmatist
Prioritization of antigen management with international surveillance tool

EuFMDiS
European foot-and-mouth disease spread model

Vademos
FMD vaccine demand estimation model

GVS
Global vaccine security

PQv
Vaccine prequalification

PCP
Progressive control pathway

PSO
Pcp practitioner officers

PPP
Public private partnership

PROTECT
RESPOND
CONTROL

MOVE FAST

FAST, Foot-and-mouth
And Similar Transboundary
animal diseases.

EuFMD structure

Secretariat, Executive Committee, Standing Technical Committee (STC), Special Committee on Risk Monitoring, Integrated Surveillance and Applied Research (SCRISAR), Special Committee on Biorisk Management (SCBRM), Regional Groups for FAST Coordination, Standing Committee on Prequalification of Vaccines against FAST diseases (SCPQv), Steering Committee TOM (SCTOM).

EuFMD Secretariat

Animal Production and Health Division, (NSA) / European Commission for the Control of Foot-and-Mouth Disease (EuFMD)

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SUSTAINABLE DEVELOPMENT GOALS

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