

Food and Agriculture Organization of the United Nations







2025 Foot-and-mouth disease quarterly report January - February - March

European Commission for the Control of Foot-and-Mouth Disease 2023-2027 Strategy Move FAST Get prepared



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Abbreviations and acronyms

ANSES	Agence nationale de sécurité sanitaire
EuFMD	European Commission for the Control of Foot-and-Mouth Disease
EURL for FMD	European Union Reference laboratory for Foot-and-mouth disease
FAST reports	foot-and-mouth and similar transboundary animal diseases reports
FLI	Friedrich Loeffler Institute
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
NT	not tested
NVD	no virus detected
NRL	National reference Laboratory
rRT-PCR	real-time reverse transcription polymerase chain reaction
SAT	Southern African Territories
SVD	swine vesicular disease
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 warm welcome to this first report for 2025. A central activity of the WOAH/FAO FMD Reference Laboratory Network (<u>www.foot-and-mouth.org</u>) is to collate outbreak data from different sources to highlight new risks for the spread of FMD virus lineages into new geographical settings. During this quarter, there have been two separate incursions of FMD into Europe while a new serotype (SAT 1) has been introduced into the Middle East. Together, these events highlight the ease by which new FMDV lineages can emerge and cross international boundaries and reinforce the importance of the work undertaken by the Network to monitor continuously FMD risks.

FMD in Germany (confirmed on 10th January 2025): Cases (a single outbreak) occurred in water buffalo located in the State of Brandenburg, near Berlin. Sequencing characterised the causative virus as serotype O (O/ME-SA/SA-2018 lineage) most closely related to a sequence associated with an FMD outbreak in far eastern Türkiye along the border with Armenia, Azerbaijan and Iran. This lineage originates from Pool 2 (Indian and surrounding countries) and has spread through separate pathways cause outbreaks in these West Eurasian and Middle East countries. Vaccine matching performed by the WRLFMD and EURL (ANSES, France) highlighted the suitability of a range of serotype O vaccines to provide cross-protection against this virus. The German authorities quickly undertook extensive surveillance to demonstrate that there had been no further spread of this virus in domesticated or susceptible wildlife, and the WOAH FMD-free status without vaccination was reinstated (on 14th April 2025).

FMD in Hungary/Slovakia (confirmed on 3rd March 2025 and 20th March 2025, respectively): FMD infection was initially identified in a group of heifers on a large dairy farm in Kisbajcs, Hungary close to the Danube and the border with Slovakia. The causative virus was identified as serotype O (O/ME-SA/PanAsia-2^{PUN-16} lineage, aka as PanAsia-2^{ANT-10}) most closely related to viruses detected in Pakistan (2017/18) and Türkiye (2024). Further outbreaks have been detected on other dairy farms in the region (as of 17/4, there are eleven outbreaks: five in Hungary and six in Slovakia) with a surveillance zone that extends into Austrian territory (Figure 1). Suppressive FMD vaccination has been used on high-risk farms in Hungary and Slovakia to reduce the potential for on-ward spread prior to slaughter.



Figure 1: Location of FMD outbreaks in Hungary and Slovakia (data from WOAH WAHIS, downloaded 2nd May 2025).

These cases represent the first FMD outbreaks in continental Europe since 2010-2011 when FMD occurred in the Burgas Province of Bulgaria. Sequence data suggest that both virus incursions originate from the European neighbourhood although the specific risk pathways by which these two different viruses have entered Europe

is not currently well-understood. Parallel introductions of two separate FMDV lineages into Europe over a short period of time raise concerns about common factors that may have increased the FMD risks in the European neighbourhood.

During the past three months, the WRLFMDL has supported the Iraqi authorities to characterise viruses associated with an upsurge of FMD cases in the country associated with many deaths of livestock. Testing at Pirbright has revealed the presence of serotype SAT1 (strain SAT1/I) and serotype O (strain O/ME-SA/SA-2018, not directly related to the FMDV from the cases in Germany). Other samples were received from a quarantine station in Bahrain which were also characterised as SAT1/I with evidence of co-infection with O/EA-2 in one of the samples. The SAT1/I sequences are distinct to the SAT1/I cases that were detected in Qatar in 2023, and originate from East Africa (the closest identity is to a virus from Tanzania collected in 2020); findings that highlight the active transmission pathways that connect East Africa to the Middle East (including the previous incursions of SAT2/XIV that occurred in 2023: https://pubmed.ncbi.nlm.nih.gov/39983696/). The emergence of this serotype in the region is an alarming event that has potential to lead to further onward rapid spread of FMD within and beyond the region since most domesticated livestock populations are immunologically naïve to this serotype. Vaccine matching data for one FMD vaccine (from Boehringer Ingelheim) is presented in this report. As far as we are aware, there are no heterologous vaccine-protection studies published anywhere for serotype SAT1 and we understand that vaccine-availability for this serotype will be more challenging than was experienced for the SAT2/XIV outbreaks in the region. There will be an important role for the reference laboratories to fill these evidence gaps; to test sera from vaccinated animals to assess the immunogenicity and relevance of candidate vaccines. FAO have recently issued an alert to raise awareness of the new risks posed by the emergence of SAT 1 in the near east and western Eurasia (https://openknowledge.fao.org/server/api/core/bitstreams/ef9dfdfe-e508-4804-8ad5-5b439a2837d2/content).

Elsewhere, after an absence of the disease for 2-years, new FMD outbreaks due to the O/ME-SA/Ind-2001e lineage have been reported in South Korea and there has also been an upsurge of field cases of FMD in Indonesia due to this lineage. Further FMD cases have been reported In North Africa (Algeria and Tunisia [O/EA-3]).

Published information on these samples can be retrieved from the following website (<u>http://www.wrlfmd.org/</u>). We also maintain a web-based dashboard (OpenFMD: <u>http://www.openfmd.org</u>) to allow users to retrieve and interrogate FMDV sequences, perform custom analyses for vaccine selection using PRAGMATIST and review FMD surveillance data.



Don King, Pirbright, April 2025

Figure 2: Recent FMD outbreaks with global epidemiological significance.

Note: New headline events reported January to March 2025 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	<u>SOUTH ASIA</u> 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	<u>SOUTHERN AFRICA</u> 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

¹FMD 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.

²Long-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.

³Egypt 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.

⁴Detection 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; \Box 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, \circ 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 Republic of Indonesia



550 **FMD type O** cases in cattle from Jawa Timur, Indonesia were reported via WAHIS in a report on 6th March 2025.

WAHIS event ID: 6310

There has been a resurgence of FMD in the central region of Indoneisa (Java and Kalimantan) since December 2024. Vaccination, market closures and disinfection are among the control measures being

implemented.

ProMED posts: 20250106.8721143, 20250108.8721212, 20250110.8721248, 20250110.8721248, 20250112.8721291, 20250115.8721378, 20250117.8721422, 20250121.8721534, 20250125.8721607, 20250129.8721678.

The Republic of Korea



FMD type O cases in cattle from Muan and Yeongam counties, Jeollanam-do, Republic of Korea were reported via WAHIS in a report on 18th March 2025.

WAHIS event ID: 6345

FMD was confirmed for the first time in Korea for 2 years on a farm in the southeast of the country in late March. An immediate 48 hour

livestock standstill was implemented in repsonse and the planned national vaccination campaign brought forward from April. Further cases in Yeongam County were discovered in the following days, with the total rising to 14 by 24th March.

ProMED posts: 20250316.8722899, 20250318.8722975, 20250325.8723128.

The Socialist Republic of Viet Nam



FMD type O cases in buffaloes, cattle and swine were reported via WAHIS during January to March 2024 from locations throughout Viet Nam in a report on 22nd January 2025.

WAHIS event ID: 5731

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, as well as awareness-raising activities for farmers and the veterinary services. During this quarter, over 410,00 large ruminants and 60,000 small ruminants have been vaccinated using a pentavalent vaccine (serotypes O, Asia-1, SAT2 and two lineages of A).

EuFMD FAST Report

The Republic of Azerbaijan



During January to March, over 300,000 large and 160,000 small ruminants were vaccinated. Active and passive surveillance is in place to monitor for outbreaks of FMD.

EuFMD FAST Report

The Kingdom of Bahrain



A batch of 56 samples was received on 31st January 2025. The following viruses were identified: 14 **FMD type SAT 1** (*SAT 1/I*), FMDV genome was detected in the seven samples, and no virus was deteted in the remaining 35 samples (see below). One sample had evidence of co-infection with O/EA-2 (see below).

Georgia



More than 69,000 large ruminants and 10,000 small ruminants have been vaccinated against FMD this quarter.

EuFMD FAST Report

The Republic of Iraq



A batch of 24 samples was received on 19th March 2025. The following viruses were identified: 7 **FMD type O** (*O/ME-SA/SA-2018*), 10 **FMD type SAT 1** (*SAT 1/I*). FMDV genome was detected in the remaining seven samples [one of these FMDV GD samples was sequenced as **FMD type SAT 1** (*SAT 1/I*)] (see below).

20 **untyped FMD** cases in Buffaloes from Al-Wahda District, Al-Karziyah, Adhamiya, Baghdad, Iraq were reported via WAHIS in a report on 24th February 2025.

WAHIS event ID: <u>6290</u>

Almost 30,000 cases of FMD have been reported this quarter, with SAT 1 being detected in the country. The last vaccination campaign was implemented in August-September 2024, followed by a booster dose campaign in October-November 2024.

In the Kurdistan Region, where there is passive surveillance, 14 outbreaks have been reported this quarter and over 3,800 sheep and goats vaccinated.

EuFMD FAST Report

Throughout this quarter there have been multiple reports of many animal deaths from FMD, with the disease spreading across the country. Preventative measures including movement restrictions, disinfection, veterinary treatment and animal slaughter by licence only were enacted to reduce the spread of the disease. FMD cases are still occurring but are "below the normal rate due to the preventive measures taken."

ProMED posts: <u>20250219.8722250</u>, <u>20250219.8722252</u>, <u>20250219.8722271</u>, <u>20250223.8722359</u>, <u>20250227.8722445</u>, <u>20250305.8722629</u>, <u>20250314.8722827</u>, <u>20250317.8722944</u>.

The State of Israel



85 **FMD type O** cases in cattle and sheep during January March 2024 were reported via WAHIS from locations throughout Israel in a report during this quarter.

WAHIS event ID: 6176

The Hashemite Kingdom of Jordan



Passive surveillance for FMD is established and a pilot initiative for syndromic surveillance for the early detection of FAST diseases is ongoing. Over 60,000 animals have been vaccinated this quarter using a vaccine containing serotypes O, A & SAT 2.

EuFMD FAST Report

The Islamic Republic of Pakistan



578 cases of FMD have been reported from three of the seven provinces/Territories in Pakistan this quarter, with serotypes O and A known to be circulating.

There is passive surveillance active in the country and samples for the annual active surveillance in Punjab province are being collected. Where an outbreak is identified, ring vaccination (with serotypes O, A and Asia-1) is implemented.

EuFMD FAST Report

The Syrian Arab Republic



Outbreaks of FMD are suspected in several governates. Blood samples collected for surveillance from Damascus and Hama governates returned 15% and 17% positive results (NSP ELISA) respectively. More than 280,000 cattle and sheep have been vaccinated this quarter.

EuFMD FAST Report

Türkiye



Over 100 outbreaks have been reported this quarter: 60 due to FMD type O, 3 from type A, 22 from type SAT 2 and 27 by untyped FMD. FMD type O is currently spreading rapidly and affecting more small ruminants, while SAT 2 is particularly affecting unvaccinated and young animals. Active and passive surveillance plans remain in use, as is the routine risk-based surveillance in the Thrace region. Preventative vaccination for large and small ruminants is planned for this year, as well as emergency

vaccination in response to outbreaks (Anatolia only).

EuFMD FAST Report

The Republic of Yemen



A government veterinary team has conducted a FMD vaccination campaign in the Al-Gharqa Al-Sufla area of Tur Al-Baha district of Lahj Governorate following the deaths of large numbers of sheep, goats, and cows in the last few weeks.

ProMED post: 20250328.8723209.

3.5. Pool 4 (North and Eastern Africa)

The People's Democratic Republic of Algeria



11 **FMD type O** cases in cattle (n=3) from Djebel Messaad, M'Sila and cattle (n=1) and sheep (n=7) from Oum Ali, Tébessa, Algeria were reported via WAHIS in a report on 3rd February 2025.

WAHIS event ID: 6236

There have been multiple reports of FMD (and Lumpy skin disease) from governates in the north of the country from throught the quarter.

Vaccination, market closures & animal gatherings banned, movement restrictions, etc. being implemented in an effort to control the spread of the disease.

ProMED posts: 20250111.8721275, 20250116.8721411, 20250119.8721478, 20250129.8721667, 20250209.8721975, 20250330.8723270.

Two FMD outbreaks have been reported this quarter. One in M'Sila wilaya and the other in Tébessa wilaya.

EuFMD FAST Report

The Arab Republic of Egypt

More than 480,000 animals have been examined in clinical surveillance activities and over 560,000 animals vaccinated.

EuFMD FAST Report



The State of Libya



The death of 20 sheep (of 200 infected) due to FMD in Al Ajaylat was announced by the Agricultural Police Department.

ProMED post: 20250106.8721136

FMD type O cases in cattle and sheep were reported via WAHIS from locations in An Nuqat Al Khams, Az Zawiyah & Tripoli, Libya in a report in January 2025.

WAHIS event ID: 6203

Four outbreaks (due to O/EA-3) were reported during this quarter. Almost 0.75% of serum samples taken as part of active surveillance tested positive for FMDV-specific antibodies. <u>EuFMD FAST Report</u>

The Republic of Tunisia



There have been two reports of FMD from governates in the north of the country during this quarter. Six cattle died from FMD in late Janaury in Nabeul governorate and three more in Jendouba Province in mid-March.

ProMED posts: 20250210.8722000, 20250320.8723024

FMD type O cases in cattle and sheep were reported via WAHIS from locations throughout Tunisia on 17th March 2025 as part of the on-going

FMD outbreak.

WAHIS event ID: 5379

Fifty-three outbreaks (FMD type O) were reported between November 2024 and March 2025.

EuFMD FAST Report

3.6. Pool 5 (West/Central Africa)



3.7. Pool 6 (Southern Africa)



WAHIS event ID: <u>6253</u>, <u>3738</u> & <u>5658</u>

3.8. Pool 7 (South America)

No new outbreaks of FMD were reported in South America.

3.9. Europe

The Federal Repul	blic of Germany
5	A batch 1 sample was received on 5 th February 2025. It was identified as
	FMD type O, (O/ME-SA/SA-2018) (see below).
	3 FMD type O cases in Buffaloes were reported via WAHIS from
	Hoppegarten, Märkisch-Oderland, Brandenburg, Germany in a report on
	10 th Janaury 2025.
	WAHIS event ID: <u>6177</u>

Three buffaloes in the Märkisch-Oderland district of Bradenburg died of FMD in early January. The last case of FMD in Germany was in 1988. The national reference laboratory at the Friedrich Loeffler Institute (FLI) confirmed the serotype was FMD type O (see below). In response the animals in the infected herd were culled, movement restrictions put in place and surveillance in the area started.

> ProMED posts: <u>20250110.8721254</u>, <u>20250112.8721295</u>, <u>20250118.8721449</u> <u>20250123.8721553</u>

Hungary



On 8th March 2025, a single FMD type O VP1 sequence was received from the Hungarian NRL for FMD (Hungary)and EURL for FMD (ANSES, France). This sequence originated from a cattle sample taken in March 2025 at Győr-Moson-Sopron megye, Hungary. Genotyping showed it to belong to the O/ME-SA/PanAsia-2^{PUN-16} sublineage (see below).

A new paper has been published to describe a revised classification of the ANT-10 sub-lineage of O/ME-SA/PanAsia-2 assigning these FMDV sequences to the PUN-16 sub-lineage, rather than ANT-10, see: https://pubmed.ncbi.nlm.nih.gov/39986259/

1064 **FMD type O** cases in cattle were reported via WAHIS from Kisbajcs, Győr, Győr-Moson-Sopron, Hungary in a report on 14th March 2025.

WAHIS event ID: 6317

FMD was identified on a farm in Kisbajcs, Gyor-Moson-Sopron County, close to the Slovakian border in mid-March. Strict regulatory measures are immediately implemented. This is the first case of FMD in Hungary in over 50 years. A second case was identified nearby a week later. The Hungarian National Reference Laboratory identified the serotype as FMD type O, and sequencing determined that it is closely related to an FMD from Pakistan in 2018 (and not the recent outbreak in Germany).

ProMED posts: 20250316.8722896, 20250327.8723179, 20250329.8723245.

The Slovak Repu	blic
	15 FMD type O cases in cattle were reported via WAHIS from locations in Dunajská Streda, Trnavský (n=14) and Plavecký Štvrtok, Bratislavský (n=1) in Slovakia during March 2025.
	WAHIS event ID: <u>6359</u>
Sat	FMD was confirmed on 3 farms in the Dunajská Streda district, Trnava, close to the Hungarian border (one farm is located within the

restriction zone established in response to the Hungarian outbreak). A fourth location was identified 5 days later. FMD last occurred in Slovakia in 1973. It has been confirmed that the FMD virus from samples taken in Slovakia, fully match the virus detected in Hungary. ProMED posts: 20250322.8723062, 20250327.8723179, 20250329.8723245.



3.10. Extent of global surveillance

Figure 2: Review of samples received during 2023 from FMD outbreaks (routine surveillance that is undertaken in countries that are FMD-free without vaccination is not shown). N.B. This figure is currently being updated soon to reflect data collected from the Network in 2024 (<u>https://www.foot-and-mouth.org/Ref-Lab-Network/Network-Annual-Meeting</u>).

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).

Lineage	South-east / 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			33					
O/ME-SA PanAsia	10							
O/SEA Mya-98	17							
O/ME-SA Ind2001	40	41	3	0				
O/ME-SA/SA-2018		40	2					
O/EA or O/WA			1	60	53.5	55	16	
O/EURO-SA								90
O/CATHAY	15							
A/ASIA Sea-97	18							
A/ASIA Iran-05	0	1	28					
A/ASIA G-VII		15	2					
A /AFRICA				28	12	15		
A/EURO-SA								10
Asia1	0	3	13					
SAT 1			1		15	1	15	
SAT 2			17	12	19	29	50	
SAT 3					0.5		19	
С								

Table 1: Conjectured relative prevalence of circulating FMD viral lineages in each Pool (last updated
October 2024). These scores can be used to inform the PRAGMATIST tool (see Annex 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 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: <u>http://www.wrlfmd.org/country-reports/country-reports-2025</u>.

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 January - March 2025 is shown in Annex 1: (Summary of submissions). A record of all samples received by WRLFMD is shown in Annex 1: (Clinical samples).

WRLFMD Batch No.	Date received	Country	Total No. samples	Serotype	No. of samples	No. of sequences	Sequencing status	
				0	1†	1†		
	24/04/2025			SAT1	14	14		
WRLFMD/2025/000002	31/01/2025	Banrain	56 "	FMDV GD	7	0	Finished	
				NVD	35	0		
WRLFMD/2025/000003	05/02/2025	Germany	1	0	1	0	Finished	
				0	7	7		
WRLFMD/2025/000006	10/03/2025	Iraq	24	SAT1	10	10	Finished	
				FMDV GD	7	1 *		
Totals			81		81	32		

Table 2: Status of sequencing of samples or sequences received by the WRLFMD fromJanuary - March 2025.

* sample IRQ 2/2025 originally reported as FMDV GD, was later accurately sequenced as SAT 1. † sample BAR 47/2025 originally reported as SAT 1, generated O and SAT 1 sequences.

Table 3: VP1 sequences submitted by other FMD laboratories to the WRLFMD from January- March 2025.

WRLFMID Batch No.	Date received	Country	Serotype	Date Collected	No. of sequences	Submitting laboratory
WRLMEG/2025/00002	11/01/2025	Germany	0	09/01/2025	1	FLI, Germany
WRLMEG/2025/000005	08/03/2025	Hungary	0	March 2025	1	Hungarian NRL for FMD & EURL for FMD (ANSES)
				Total	1	

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.











4.4. 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. Europe





4.9. Vaccine matching

Antigenic characterisation of FMD field isolates by matching with vaccine strains by 2dmVNT from January - March 2025.

NOTES:

- 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).
- 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.

Serotype	0	Α	С	Asia 1	SAT 1	SAT 2	SAT 3
Germany	1	-	-	-	-	-	-
Total	1	0	0	0	0	0	0

Table 4: Summary of samples tested by vaccine matching.

* Note: further testing of historical submissions.

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.

	Vaccine Match
М	$r_1 = \ge 0.3$ - 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.
	No Vaccine Match
N	$r_1 = < 0.3$ - 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 TCID₅₀.

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 Ca Boeh Inge	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	
GER 1/2025	-	-	0.84	1.96	0.48	2.06	0.58	2.44	1.00	2.41	0.56	2.15	0.97	2.37	

New Vaccine

Vaccine data for a new vaccine produced by Biogénesis Bagó: SAT 2 Oman 2015.

Results of testing against the new vaccine are presented in Table 6 below alongside the previously reported testing against SAT 2 Zim 83 and SAT 2 Eritrea 98 (Boehringer Ingelheim).

Isolate	Serotype SAT 2		SAT2 Boehringe	Zim 83 r Ingelheim	SAT2 E Boehringe	ritrea 98 er Ingelheim	SAT2 Oman 2015 Biogénesis Bagó	
	Topotype	Lineage	r ₁	titre	r ₁	titre		
NIG 51/2020	VII	-	0.35	2.08	1.00	2.09	0.77	2.81
SUD/14/2017	VII	Alx-12	0.32		0.76		0.43	2.56
EGY 1/2018	VII	Ghb-12	0.11		0.28		0.52	2.65
ERI 28/2019	VII	Lib-12	0.25	1.80	0.76	1.62	0.76	2.81
ETH 31/2019	VII	Lib-12	0.23	1.80	0.76	1.59	0.78	2.82
NIG 1/2021	VII	Lib-12	0.35	2.03	0.71	1.87	0.99	2.92
BAR 7/2022	XIV	-	0.53	1.99	0.53	1.62	0.37	2.49
ETH 3/2022	XIV	-	0.15	1.70	0.49	1.66	0.34	2.46
ETH 1/2023	XIV	-	0.10	1.64	0.27	1.49	0.35	2.48
IRQ 9/2023	XIV	-	0.31	1.95	0.42	1.51	0.50	2.63
JOR 20/2023	XIV	-	0.24	1.81	0.83	1.85	0.45	2.58
TUR 17/2023	XIV	-	0.25	1.86	0.72	1.52	0.59	2.70

Table 6: Vaccine matching studies including data for a new vaccine SAT 2 Oman 2015

STOP PRESS: Report for SAT 1 vaccine matching

The table below outlines results for vaccine matching that has been performed by the WRLFMD. These results were generated using a new batch of bovine vaccine sera (BVS) which was generated by Boehringer Ingelheim using their aqueous formulated monovalent vaccine. NB: These data replace the results that were circulated in earlier presentations and reports from the WRLFMD.

Table 7: SAT 1 vaccine matching data for representative SAT1/I isolates collected from the Middle East (2023 and 2025)

Isolate	Serotype	e SAT 1	SAT1 Rho78 Boehringer Ingelheim		
	Topotype	Lineage	r ₁	titre	
BAR 37/2025	I(NWZ)	-	0.31	2.20	
BAR 50/2025	I(NWZ)	-	0.39	2.30	
IRQ 1/2025	I(NWZ)	-	0.26	2.13	
IRQ 11/2025	I(NWZ)	-	0.19	2.00	
QTR 6/2023	I(NWZ)	-	0.42	2.34	
QTR 7/2023	I(NWZ)	-	0.61	2.50	

Annex 1: Sample data

Summary of submissions

Table 8: Summary of samples collected and received to WRLFMD January - March 2025

		Virus isolation in cell culture/ELISA									
Country	N ^o of samples		FMD virus serotypes					Virus tected	RT-PCR for FMD		
		0	Α	С	SAT 1	SAT 2	SAT 3	ASIA1	De	Positive	Negative
Bahrain	56	0†	0	0	14	0	0	0	42	19	37
Germany	1	1	0	0	0	0	0	0	0	1	0
Iraq	24	7	0	0	10	0	0	0	7	24	0
TOTAL	81	9	0	0	24	0	0	0	49	44	37

† sample BAR 47/2025 originally reported as SAT 1, generated O and SAT 1 sequences.

Clinical samples

Table 9: Clinical sample diagnostics made by the WRLFMD January - March 2025

Date					Results					
Country	Received	Reported	WRL for FMD Sample Identification	Animal	Date of Collection	VI/ELISA	RT-PCR	Final report		
Bahrain	31 Jan	28 Feb	BAR 1/2025	CATTLE	14 Jan 2025	SAT 1	FMDVGD	SAT 1		
	2025	2025	BAR 2/2025	CATTLE	14 Jan 2025	NVD	FMDVGD	NVD		
			BAR 3/2025	CATTLE	14 Jan 2025	SAT 1	FMDVGD	SAT 1		
			BAR 4/2025	CATTLE	14 Jan 2025	NVD	FMDVGD	NVD		
			BAR 5/2025	CATTLE	14 Jan 2025	SAT 1	FMDVGD	SAT 1		
			BAR 6/2025	CATTLE	14 Jan 2025	SAT 1	FMDVGD	SAT 1		
			BAR 7/2025	CATTLE	14 Jan 2025	NVD	FMDVGD	NVD		
			BAR 8/2025	CATTLE	14 Jan 2025	NVD	NGD	NVD		
			BAR 9/2025	CATTLE	14 Jan 2025	NVD	NGD	NVD		
			BAR 10/2025	CATTLE	14 Jan 2025	NVD	NGD	NVD		
			BAR 11/2025	CATTLE	14 Jan 2025	NVD	NGD	NVD		
			BAR 12/2025	CATTLE	14 Jan 2025	NVD	NGD	NVD		
			BAR 13/2025	CATTLE	16 Jan 2025	NVD	NGD	NVD		
			BAR 14/2025	CATTLE	16 Jan 2025	NVD	NGD	NVD		
			BAR 15/2025	CATTLE	16 Jan 2025	NVD	NGD	NVD		
			BAR 16/2025	CATTLE	16 Jan 2025	NVD	NGD	NVD		
			BAR 17/2025	CATTLE	16 Jan 2025	NVD	NGD	NVD		
			BAR 18/2025	CATTLE	16 Jan 2025	SAT 1	FMDVGD	SAT 1		
			BAR 19/2025	CATTLE	16 Jan 2025	NVD	FMDVGD	NVD		
			BAR 20/2025	CATTLE	16 Jan 2025	NVD	FMDVGD	NVD		

	Date					Results			
Country	Received	Reported	WRL for FMD Sample Identification	Animal	Date of Collection	VI/ELISA	RT-PCR	Final report	
			BAR 21/2025	CATTLE	16 Jan 2025	NVD	NGD	NVD	
			BAR 22/2025	CATTLE	16 Jan 2025	NVD	NGD	NVD	
			BAR 23/2025	CATTLE	16 Jan 2025	NVD	NGD	NVD	
			BAR 24/2025	CATTLE	19 Jan 2025	NVD	NGD	NVD	
			BAR 25/2025	CATTLE	19 Jan 2025	SAT 1	NGD	SAT 1	
			BAR 26/2025	CATTLE	19 Jan 2025	NVD	NGD	NVD	
			BAR 27/2025	CATTLE	20 Jan 2025	NVD	NGD	NVD	
			BAR 28/2025	CATTLE	20 Jan 2025	NVD	NGD	NVD	
			BAR 29/2025	CATTLE	20 Jan 2025	NVD	NGD	NVD	
			BAR 30/2025	CATTLE	20 Jan 2025	NVD	FMDV GD	NVD	
			BAR 31/2025	CATTLE	20 Jan 2025	NVD	NGD	NVD	
			BAR 32/2025	CATTLE	20 Jan 2025	NVD	NGD	NVD	
			BAR 33/2025	CATTLE	20 Jan 2025	NVD	NGD	NVD	
			BAR 34/2025	CATTLE	20 Jan 2025	NVD	NGD	NVD	
			BAR 35/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 36/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 37/2025	CATTLE	21 Jan 2025	SAT 1	FMDVGD	SAT 1	
			BAR 38/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 39/2025	CATTLE	21 Jan 2025	SAT 1	FMDVGD	SAT 1	
			BAR 40/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 41/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 42/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 43/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 44/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 45/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 46/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 47/2025	CATTLE	21 Jan 2025	SAT 1	FMDVGD	SAT 1 [†]	
			BAR 48/2025	CATTLE	21 Jan 2025	NVD	NGD	NVD	
			BAR 49/2025	CATTLE	21 Jan 2025	SAT 1	NGD	SAT 1	
			BAR 50/2025	CATTLE	22.Jan 2025	SAT 1	FMDVGD	SAT 1	
			BAR 51/2025	CATTLE	22 Jan 2025	SAT 1	FMDVGD	SAT 1	
			BAR 52/2025	CATTLE	22 Jan 2025	SAT 1	FMDVGD	SAT 1	
			BAR 53/2025	CATTLE	28 Jan 2025	NVD	FMDVGD	NVD	
			BAR 54/2025	CATTLE	28 Jan 2025	NVD	NGD	NVD	
			BAR 55/2025	CATTLE	28 Jan 2025	SAT 1	FMDVGD	SAT 1	
	•·		BAR 56/2025	CATTLE	28 Jan 2025	NVD	NGD	NVD	
Germany	05 Feb 2025	20 Feb 2025	GER 1/2025	BUFFALO	09 Jan 2025	0	FMDVGD	0	
Iraq	10 Mar	17 Mar	IRQ 1/2025	BUFFALO	04 Feb 2025	SAT 1	FMDVGD	SAT 1	
	2025	2025	IRQ 2/2025	BUFFALO	12 Feb 2025	NVD	FMDVGD	NVD	
			IRQ 3/2025	CATTLE	13 Feb 2025	SAT 1	FMDVGD	SAT 1	
			IRQ 4/2025	BUFFALO	15 Feb 2025	SAT 1	FMDVGD	SAT 1	

	Da	ite					Results	
Country	Received	Reported	WRL for FMD Sample Identification	Animal	Date of Collection	VI/ELISA	RT-PCR	Final report
			IRQ 5/2025	BUFFALO	15 Feb 2025	NVD	FMDVGD	NVD
			IRQ 6/2025	BUFFALO	17 Feb 2025	NVD	FMDVGD	NVD
			IRQ 7/2025	BUFFALO	17 Feb 2025	NVD	FMDVGD	NVD
			IRQ 8/2025	CATTLE	17 Feb 2025	0	FMDVGD	0
			IRQ 9/2025	BUFFALO	17 Feb 2025	NVD	FMDVGD	NVD
			IRQ 10/2025	CATTLE	18 Feb 2025	0	FMDVGD	0
			IRQ 11/2025	BUFFALO	19 Feb 2025	SAT 1	FMDVGD	SAT 1
			IRQ 12/2025	BUFFALO	20 Feb 2025	NVD	FMDVGD	NVD
			IRQ 13/2025	BUFFALO	20 Feb 2025	SAT 1	FMDVGD	SAT 1
			IRQ 14/2025	BUFFALO	20 Feb 2025	0	FMDVGD	0
			IRQ 15/2025	CATTLE	25 Feb 2025	NVD	FMDVGD	NVD
			IRQ 16/2025	BUFFALO	25 Feb 2025	SAT 1	FMDVGD	SAT 1
			IRQ 17/2025	CATTLE	25 Feb 2025	0	FMDVGD	0
			IRQ 18/2025	CATTLE	25 Feb 2025	SAT 1	FMDVGD	SAT 1
			IRQ 19/2025	CATTLE	25 Feb 2025	SAT 1	FMDVGD	SAT 1
			IRQ 20/2025	CATTLE	25 Feb 2025	0	FMDV GD	0
			IRQ 21/2025	BUFFALO	25 Feb 2025	0	FMDVGD	0
			IRQ 22/2025	BUFFALO	25 Feb 2025	SAT 1	FMDVGD	SAT 1
			IRQ 23/2025	BUFFALO	25 Feb 2025	SAT 1	FMDVGD	SAT 1
			IRQ 24/2025	CATTLE	25 Feb 2025	0	FMDVGD	0
T	otal		81					

† sample BAR 47/2025 originally reported as SAT 1, generated O and SAT 1 sequences.

Annex 2: FMD publications

Recent FMD Publications January - March 2025 cited by Web of Science.

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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 3.10, above), as well as available in vitro, in vivo and field data to score the ability of vaccines to protect against these FMDV lineages.



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 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 <u>EuFMD's open-access Courses</u> provide convenient self-paced training which you may study anytime, anywhere, free of charge:
 - Introduction to Foot-and-Mouth Disease (also available in <u>French</u> and <u>German</u>); 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 selfdirected 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.
- Simulation Exercises for Animal Disease Emergencies; Introduces simulation exercises as part of preparedness for animal disease emergencies and explains the processes involved in planning, conducting and evaluating simulation exercises. It also describes the various tools, approaches and strategies to support decision-making, as well as the different phases of an exercise.
- Public Private Partnerships in the Veterinary Domain; Introduces the potential for partnership between public and private sectors in the delivery of veterinary services and discusses the typology and implementation of such partnerships (developed under a partnership with the WOAH and accessed on the WOAH e-learning platform).
- **<u>IZSLER residential training</u>** from 18 to 30 May 2025 in Brescia, Italy.

Meetings

- <u>GF-TADs FMD/PPR Middle East Roadmap meeting</u>, Riyadh Saudi Arabia 27-30 April 2025
- 46th General Session of the EuFMD 6 to 7 May 2025

Other sources of information from EuFMD

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

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 are being shipped to the participating laboratories.



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EuFMD's programme, tools and initiatives



animal diseases

Dt EuFMD digital transformation

Tom EuFMD training management system



Sim ExOn

Vlearning EuFMD virtual learning

Get prepared Emergency preparedness toolbox

Prioritization of antigen management with international surveillance tool Risk Communications

EUFMDIS European foot-and-mouth disease spread model



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

Vademos

FMD vaccine demand estimation model

Global vaccine security



Vaccine prequalification

Progressive control pathway



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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