World Organisation for Animal Health

Santina Grazioli - - ITALY

WOAH Reference Laboratory Reports Activities 2025

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LABORATORY INFORMATION

***Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:**	Foot and mouth disease
***Address of laboratory:**	Via Bianchi, 9 - 25124 Brescia - Italy
***Tel:**	+390-30 229 03 10
***E-mail address:**	santina.grazioli@izsler.it
Website:	www.izsler.it
***Name (including Title) of Head of Laboratory (Responsible Official):**	Dr. Giorgio Varisco, General Director, IZSLER
***Name (including Title and Position) of WOAH Reference Expert:**	Dr. Santina Grazioli Head of National/WOAH Reference Centre for FMD and SVD, Head of Biotechnology Lab
***Which of the following defines your laboratory? Check all that apply:**	Governmental

TOR1: DIAGNOSTIC METHODS

1. Did your laboratory perform diagnostic tests for the specified disease/topic for purposes such as disease diagnosis, screening of animals for export, surveillance, etc.? (Not for quality control, proficiency testing or staff training)

Yes

Diagnostic Test	Indicated in WOAH Manual (Yes/No)	Total number of test performed last year	
Indirect diagnostic tests		Nationally	Internationally
Competitive ELISA – Ab to SP type O	Yes	17788	51
Competitive ELISA – Ab to SP type A	Yes	965	51
Competitive ELISA – Ab to SP type Asia 1	Yes	965	0
Competitive ELISA – Ab to SP type SAT 2	Yes	965	51
Competitive ELISA – Ab to SP type SAT 1	Yes	965	0
NSP Ab ELISA (3ABC trapping ELISA)	Yes	1934	51
Direct diagnostic tests		Nationally	Internationally
Virus isolation	Yes	0	9
Antigen ELISA	Yes	0	9
Real Time RT-PCR (3D)	Yes	23	22
Real Time RT-PCR (O EA3)	Yes	0	22
VP1 sequencing	Yes	0	4
Phylogenetic analyses	Yes	0	4

TOR2: REFERENCE MATERIAL

2. Did your laboratory produce or supply imported standard reference reagents officially recognised by WOAH?

No

3. Did your laboratory supply standard reference reagents (nonWOAH-approved) and/or other diagnostic reagents to WOAH Members?

Yes

Type of reagent available	Related diagnostic test	Produced/ provide	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	No. of recipient WOAH Member Countries	Country of recipients
Ready-to-use ELISA kit for FMDV NSP antibodies (1 kit=5 plates)	FMDV NSP Ab ELISA (3ABC trapping ELISA)	Produced and provided	0	88	14	ALGERIA, ARMENIA, GREECE, ISRAEL, JORDAN, KENYA, LATVIA, MALTA, NIGERIA, PAKISTAN, TAJIKISTAN, TURKEY, UGANDA, UNITED ARAB EMIRATES,
Ready-to-use kit: FMDV Antigen Detection ELISA and serotyping (O, A , Asia1, C, SAT1-2) (1 kit= 5 plates)	Ag detection and serotyping ELISA	Produced and provided	0	210	38	ALBANIA, ARGENTINA, ARMENIA, AZERBAIJAN, BOSNIA AND HERZEGOVINA, BRAZIL, BULGARIA, CHINA (PEOPLE'S REP. OF), CYPRUS, CZECH REPUBLIC, DENMARK, EGYPT, ESTONIA, ETHIOPIA, FINLAND, GREECE, IRAQ, IRELAND, JORDAN, KOREA (DEM. PEOPLE'S. REP. OF), KOSOVO, KYRGYZSTAN, LATVIA, MALTA, MOLDOVA, MONTENEGRO, NORTH MACEDONIA (REP. OF), NORWAY, PAKISTAN, SAUDI ARABIA, SERBIA, SRI LANKA, SWITZERLAND, TURKEY, UGANDA, UNITED ARAB EMIRATES, ZAMBIA,
Ready-to-use ELISA kit for FMDV SP-Ab Type O (1 kit=5 plates)	Solid-phase competitive ELISA (SPAb type O)	Produced and provided	70	184	33	ALBANIA, BANGLADESH, BOSNIA AND HERZEGOVINA, BULGARIA, CHINA (PEOPLE'S REP. OF), CROATIA, CZECH REPUBLIC, EGYPT, ESTONIA, GEORGIA, INDIA, IRAQ, IRELAND, JORDAN, KAZAKHSTAN, KENYA, KOREA (REP. OF), KOSOVO, KYRGYZSTAN, MALTA, MOLDOVA, MONGOLIA, MONTENEGRO, NIGERIA, NORTH MACEDONIA (REP. OF), ROMANIA, SAUDI

						ARABIA, SERBIA, TAJIKISTAN, TURKEY, UNITED ARAB EMIRATES, ZAMBIA,
Ready-to-use ELISA kit for FMDV SP-Ab Type A (1 kit=5 plates)	Solid-phase competitive ELISA (SPAb type O)	Produced and provided	0	123	33	ALBANIA, BANGLADESH, BOSNIA AND HERZEGOVINA, BULGARIA, CROATIA, CZECH REPUBLIC, EGYPT, ESTONIA, GEORGIA, GREECE, IRAQ, JORDAN, KAZAKHSTAN, KENYA, KOSOVO, KYRGYZSTAN, LATVIA, MALTA, MOLDOVA, MONTENEGRO, MOROCCO, NEW ZEALAND, NIGERIA, SAUDI ARABIA, SERBIA, SLOVAKIA, TAJIKISTAN, TURKEY, UNITED ARAB EMIRATES, ZAMBIA,
Ready-to-use ELISA kit for FMDV SP-Ab Type Asia1 (1 kit=5 plates)	Solid-phase competitive ELISA (SPAb type Asia1)	Produced and provided	0	71	27	ALBANIA, BANGLADESH, BOSNIA AND HERZEGOVINA, BULGARIA, CROATIA, CZECH REPUBLIC, ESTONIA, GEORGIA, GREECE, IRAQ, JORDAN, KAZAKHSTAN, KOREA (REP. OF), KOSOVO, KYRGYZSTAN, LATVIA, MALTA, MOLDOVA, MONTENEGRO, NEW ZEALAND, NORTH MACEDONIA (REP. OF), SERBIA, SLOVAKIA, TAJIKISTAN, TURKEY, UNITED ARAB EMIRATES,
Ready-to-use ELISA kit for SPAb Type SAT1 (1 kit=5 plates)	Solid-phase competitive ELISA (SP Ab type SAT1)	Produced and provided	0	133	17	ARGENTINA, CHINA (PEOPLE'S REP. OF), CZECH REPUBLIC, EGYPT, GREECE, IRAQ, JORDAN, KENYA, MALTA, MOROCCO, NEW ZEALAND, NIGERIA, SAUDI ARABIA, SLOVENIA, TURKEY, UNITED ARAB EMIRATES, ZAMBIA,
						ALBANIA, ARMENIA, AZERBAIJAN, BOSNIA AND HERZEGOVINA, BULGARIA, CYPRUS, CZECH REPUBLIC, EGYPT, ESTONIA, GEORGIA, GREECE,

Ready-to-use ELISA kit for SPAb Type SAT2 (1 kit=5 plates)	Solid-phase competitive ELISA (SP Ab type SAT2)	Produced and provided	0	119	30	IRAQ, JORDAN, KENYA, KOSOVO, MALTA, MOLDOVA, MONTENEGRO, MOROCCO, NEW ZEALAND, NIGERIA, NORTH MACEDONIA (REP. OF), ROMANIA, SAUDI ARABIA, SERBIA, SLOVAKIA, SWITZERLAND, TURKEY, UNITED ARAB EMIRATES, ZAMBIA,

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAH Members?

TOR3: NEW PROCEDURES

6. Did your laboratory develop new diagnostic methods for the designated pathogen or disease?

No

7. Did your laboratory validate diagnostic methods according to WOAH Standards for the designated pathogen or disease?

No

8. Did your laboratory develop new vaccines for the designated pathogen or disease?

9. Did your laboratory validate vaccines according to WOAH Standards for the designated pathogen or disease?

TOR4: DIAGNOSTIC TESTING FACILITIES

10. Did your laboratory carry out diagnostic testing for other WOAH Members?

Yes

Name of WOAH Member Country seeking assistance	Date	Which diagnostic test used	No. samples received for provision of diagnostic support	No. samples received for provision of confirmatory diagnoses
LIBYA	2025-02-25	SPCE type O, A, SAT2, NSP ELISA,	0	51
LIBYA	2025-02-25	rRT-PCR, Antigen detection ELISA, cell colture, VP1 sequencing	0	22

11. Did your laboratory provide expert advice in technical consultancies on the request of an WOAH Member?

No

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

12. Did your laboratory participate in international scientific studies in collaboration with WOAH Members other than the own?

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	WOAH Member Countries involved other than your country
Research agreement between IZSLER and the Pirbright Institute	2021-2027	Research and development of assay for FMDV diagnosis	The Pirbright Insitute	
Support to countries of the Middle East regions to progress along the FMD Progressive Control Pathway (PCP).	2024-2027	The WOAH - FMD project aims to support countries in the Middle East in progressing through the Foot-and-Mouth Disease (FMD) Progressive Control Pathway (PCP).	WOAH	EGYPT IRAQ JORDAN LEBANON PALESTINIAN AUTON. TERRITORIES SYRIA

13. In exercising your activities, have you identified any regulatory research needs* relevant for WOAH?

No

TOR6: EPIZOOLOGICAL DATA

14. Did your Laboratory collect epidemiological data relevant to international disease control?

Yes

If the answer is yes, please provide details of the data collected:
Confirmation the circulation of serotype O which belongs to the EA-3 topotype in Lybia.

15. Did your laboratory disseminate epidemiological data that had been processed and analysed?

Yes

If the answer is yes, please provide details of the data collected:
Data disseminated at the WOAH/FAO FMD Laboratory Network Meeting

16. What method of dissemination of information is most often used by your laboratory? (Indicate in the appropriate box the number by category and list the details in the box)

a) Articles published in peer-reviewed journals:

7

1. Efrem Alessandro Foglia, Valerie Mioulet, Simone Cavalera, Jozhel Baguisi, Sena İnel Turgut, Abraham Sangula, Salman Khan, Syed Muhammad Jamal, Harry Bull, Sergio Rosati, Chiara Nogarol, Giulia Pezzoni, Abdulnaci Bulut, Donald P. King, Laura Anfossi, Fabrizio Rosso, Emiliana Brocchi, Santina Grazioli
Validation of two multiplex lateral flow devices for the rapid detection and typing of foot-and-mouth disease viruses
Research in Veterinary Science 185 (2025) 105558, https://doi.org/10.1016/ j.rvsc.2025.105558
2. Tiziana Trogu, Giancarlo Ferrari, Ayham Abdulkader, Mario Younan, Jaffan Dayub, Efrem A. Foglia, Shahin Baiomy, Cornelis van Maanen, Hashim Abdelbaky Mansour, Ausama A. Yousif, Emad Bennour ,Nussieba A. Osman, Mohammad Khalifeh, Fabrizio Rosso, and Santina Grazioli
Update on Foot-and-Mouth Disease in North-Western Syria:
Circulating Serotypes and Post-Vaccination Monitoring
Transboundary and Emerging Diseases Volume 2025, Article ID 8865069, 9 pages, https://doi.org/10.1155/tbed/8865069
3. Paton DJ, Wilsden G, Browning CF, Foglia EA, Di Nardo A, Knowles NJ, Wadsworth J, Gubbins S, Chitsungo E, Boukary CRM, Ayelet G, Bodjo CS, Nwankpa N, Brocchi E, Grazioli S, Ludi A, King DP. An antigen panel to assess the regional relevance of foot and mouth disease vaccines. NPJ Vaccines. 2025 May 26;10(1):106. doi: 10.1038/s41541-025-01128-7. PMID: 40419503; PMCID: PMC12106609.
4. Abdelaziz A. Yassin, Anna B. Ludi, Santina Grazioli, Emiliana Brocchi, Daniel Horton, Donald P. King and Amin S. Asfor
Mapping cross-reactive residues in the G-H loop of foot-and-mouth disease virus: insights for serotype-specific design. Frontiers, published 23 July 2025 DOI 10.3389/fmicb.2025.1631386
5. S. Berryman, A. Asfor, E. Benham, N. Howe, A. Burman, E. Brocchi, S. Grazioli, T.J. Tuthill
Foot-and-mouth disease vaccine quality: A universal test for intact viral capsids based on detection of VP4
Vaccine Volume 51, 2 April 2025 126845 https://doi.org/10.1016/j.vaccine.2025.126845
6. Michele Pesciaroli, Alessandro Bellato, Alessandra Scaburri, Annalisa Santi, Alessandro Mannelli and Silvia Bellini
Modelling the Spread of Foot and Mouth Disease in Different Livestock Settings in Italy to Assess the Cost Effectiveness of Potential Control Strategies.
Animals 2025, 15, 386 https://doi.org/10.3390/ani15030386
7. Bellini S, Scaburri A, Tironi M, Cappa V, Mannelli A, Alborali GL. Simulating the Spread of Foot-and-Mouth Disease in Densely Populated Areas as Part of Contingency Plans to Establish the Best Control Options.
Pathogens. 2025 Sep 16;14(9):933. doi: 10.3390/pathogens14090933

b) International conferences:

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Title of event: 27^ International Congress of the FeMeSPRum
Date and location: 4-6 September 2025, Bologna Italy
1. Foglia EA, Mioulet V, Cavalera S, Baguisi J, Turgut Sİ, Sangula A, Khan S, Jamal SM, Bull H, Rosati S, Nogarol C, Pezzoni G, Bulut A, King DP, Anfossi L, Rosso F, Brocchi E,

Grazioli S. Validation of two multiplex lateral flow devices for the rapid detection and typing of foot-and-mouth disease viruses (oral presentation)
2. C. Torreggiani, T. Trogu, M. Begovoeva, S. Grazioli, M. Nardi, F. Rosso
Strengthening Preparedness: Training Strategies for Foot-and-Mouth Disease Outbreak (oral presentation).

Title of event: GFRA 2025 Scientific Meeting – Istanbul 21-23 Ottobre 2025
Date and location: 21-23 October 2025, Instanbul, Turkey
1. Foglia EA, Castelli A, Filippini E, Pezzoni G. Development of a Reverse Transcription - Recombinase Polymerase Amplification (RT-RPA) for on-field detection of Foot-and-Mouth Disease Virus.
2. Maccabiani G, Burman A, Mioulet V, Foglia EA, Scaramuzza M, Soldati R, Trogu T, Ludi A, King DP, Grazioli S. Monoclonal antibodies against FMDV type SAT 3: preliminary characterization and potential use in diagnostic assays.
3. Ludi A, Paton D, Wilsden G, Di Nardo A, Knowles NJ, Wadsworth J, Gubbins S, Chitsungo E, Boukary CRM, Ayelet G, Bodjo CS, Nwankpa N, Brocchi E, Foglia EA, Grazioli S, King DP. Assessing FMD Vaccine Quality – moving beyond vaccine matching
4. Tiziana Trogu, Antonello Di Nardo, Donald King, Ibrahim Eldaghayes, Alfurjani Krim, Fadila Abosrer, Fabrizio Rosso, Shahin Baiomy, Santina Grazioli, Giampietro Maccabiani, Giulia Pezzoni
Recent incursions of FMDV topotype O/EA-3 in Libya (2019-2025)
5. Amina Yasmin, Chloe Grant, Alison Burman, Eva Perez-Martin, Massimiliano Bugatti, Santina Grazioli, Andrew Bentham, Kerry Mitchell, Cristina Ribeiro, Alison Wakeham, Don King, Anna Ludi, Stephen Berryman, Toby Tuthill
Development of in vitro tests for FMD vaccine quality using ELISA and Lateral Flow Device
6. Dr. Grazioli: "Monoclonal antibodies for FMD diagnostics: still a strategic resource." KeyNote lecture

c) National conferences:

0

d) Other (Provide website address or link to appropriate information):

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https://www.izsler.it/chi-siamo/per-chi-e-con-chi-lavoriamo/centri-di-referenza/laboratorio-di-referenza-woah-foot-and-mouth-disease/

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

17. Did your laboratory provide scientific and technical training to laboratory personnel from other WOAH Members?

Yes

a) Technical visit : 0

b) Seminars : 0

c) Hands-on training courses: 3

d) Internships (>1 month) 0

Type of technical training provided (a, b, c or d)	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
C	MAURITANIA	1
C	ARMENIA	1
C	GEORGIA	1
C	AZERBAIJAN	1
C	LIBYA	2
C	KENYA	2
C	EGYPT	3
C	IRAQ	3
C	JORDAN	4
C	LEBANON	3
C	PALESTINIAN AUTON. TERRITORIES	2

C	SYRIA	3

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
UNI CEI EN ISO/IEC 17025:2018	pdf	Certificate ISO17025 IZSLER.pdf
UNI EN ISO 9001: 2015	pdf	Certificate ISO9001 IZSLER.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Competitive ELISA – SP antibodies (FMDV type O, A, Asia1, SAT1, SAT2)	Accredia: Italy System Accreditation Service
VNT for SP-Ab detection against each of the 7 FMDV serotypes	Accredia: Italy System Accreditation Service
NSP Ab ELISA (3ABC trapping ELISA)	Accredia: Italy System Accreditation Service
FMDV Antigen detection and serotyping ELISA	Accredia: Italy System Accreditation Service
Realtime RT-PCR (3D and 5'UTR regions)	Accredia: Italy System Accreditation Service
Other assays (Virus Isolation, VP1 sequencing, Topotypesspecific realtime RT-PCR) are IZSLER-coded tests	Accredia: Italy System Accreditation Service

20. Does your laboratory maintain a "biorisk management system" for the pathogen and the disease concerned?

Yes

Management system of high containment lab in compliance with "Minimum Biorisk Management standards for foot and mouth disease laboratories (MBRMS)"

TOR9: SCIENTIFIC MEETINGS

21. Did your laboratory organise scientific meetings related to the pathogen in question on behalf of WOAH?

No

22. Did your laboratory participate in scientific meetings related to the pathogen in question on behalf of WOAH?

Yes

Title of event	Date	location	Role (speaker, presenting poster, short communications)	Title of the work presented
92th GS WOAH, "Regional Commission meeting for Meddle East"	2025-05-24	Paris, France	Speaker	Implementation of Post Vaccination Monitoring studies for FMD in the region
20th WOAH/FAO FMD Laboratory Network Meeting	2025-10-22	Istanbul Turkey	Participant as Lab expert	Updates from the WOAH/FAO reference lab-IZSLER

TOR10: NETWORK WITH WOAH REFERENCE LABORATORIES

23. Did your laboratory exchange information with other WOAH Reference Laboratories designated for the same pathogen or disease?

Yes

24. Are you a member of a network of WOAH Reference Laboratories designated for the same pathogen?

Yes

NETWORK/DISEASE	ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS
WOAH/FAO Laboratory Network for FMD	participant	20	WOAH/FAO designed experts for FMD

25. Did you organise or participate in inter-laboratory proficiency tests with WOAH Reference Laboratories designated for the same pathogen during the past 2 years?

Yes

Purpose of the proficiency test:	Role of your Reference Laboratory (organiser/ participant)	No. participating Laboratories	Participating WOAH Ref. Labs/ organising WOAH Ref Lab

FMD/SVD Proficiency Test 2025, organized by the FMD-EURL, ANSES, France	Participant	unknown	ANSES, France
FMD Proficiency Test Scheme (PHASE 2024/2025), organized by the FMD-WRL	Participant	unknown	The Pirbright Institute , UK

26. Did your laboratory collaborate with other WOAH Reference Laboratories for the same disease on scientific research projects for the diagnosis or control of the pathogen of interest?

Yes

Title of the project or contract	Scope	Name(s) of relevant WOAH Reference Laboratories
Research agreement to development of new and improved diagnostic ELISAs and reagents	Six different projects finalized to improve and apply new technology for FMD serology and antigen detection.	The Pirbright Institute, UK

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

27. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than WOAH Reference Laboratories for the same pathogen during the past 2 years?

Yes

Purpose for inter-laboratory test comparisons1	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Name of the test	WOAH Member Countries
Organization of a National Proficiency Test for FMD, to build and maintain preparedness of regional laboratories to support the NRL in case of emergency	Provider	10	SPCE type O	
Organization of a National Proficiency Test for FMD, to build and maintain preparedness of regional laboratories to support the NRL in case of emergency	Provider	10	Realtime RT-PCR	

TOR12: EXPERT CONSULTANTS

28. Did your laboratory place expert consultants at the disposal of WOAH?

Yes

Kind of consultancy	Location	Subject (facultative)
Contribute to the revision of WOAH Terrestrial Manual chapter on FMD	on line	participation in the working group for the revision of the FMD chapter of WOAH Terrestrial Manual

29. Additional comments regarding your report:

No