World Organisation for Animal Health

Valery Zakharov - - RUSSIA

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:**	Address of laboratory: ulitsa Gvardeyskaya, 6, microraion Yur'evets, Vladimir Oblast, Vladimir, Russia, 600901
***Tel:**	+7-4922 26 06 14
***E-mail address:**	arriah@fsvps.gov.ru
Website:	www.arriah.ru
***Name (including Title) of Head of Laboratory (Responsible Official):**	Khasan M. Likhov Director of Federal State-Financed Institution «Federal Centre for Animal Health» of Federal Service for Veterinary and Phytosanitary Surveillance (FGBI "ARRIAH")
***Name (including Title and Position) of WOAH Reference Expert:**	Valery Zakharov, ARRIAH expert, Doctor of Science (Veterinary Medicine), professor
***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
Liquid-phase blocking ELISA (LPB ELISA)	Yes	239229	130
Virus neutralization test (VNT)	Yes	9009	130
Indirect NSP-ELISA (ELISA-NSP)	Yes	126974	0
Antigenic matching in VNT	Yes	469	13
Direct diagnostic tests		Nationally	Internationally
Virus isolation in cell culture	Yes	98	3
Indirect double sandwich ELISA	Yes	98	3
CFT	Yes	98	0
Real-time RT-PCR, 3D gene	Yes	5574	3
Real-time RT-PCR, 5'HTO gene	Yes	5574	3
RT-PCR, VP1 gene	Yes	0	3
VP1 gene sequencing	Yes	0	3

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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
ELISA kit for detection of FMD antibodies in animal sera	LPB ELISA	....	1240 kits	9 kits	3	BELARUS, RUSSIA, TAJIKISTAN,
ELISA kit for detection of FMDV antigen	ELISA (Ag detection ELISA)	....	1 kit	1 kit	2	RUSSIA, TAJIKISTAN,
FMD NSP-ELISA kit	NSP-ELISA	....	338 kits	2 kits	3	BELARUS, RUSSIA, TAJIKISTAN,
FMDV RT-qPCR kit	FMDV RT-PCR	....	2 test-sistems	-	1	RUSSIA,
Type-specific FMDV serum	CFT	...	-	60 ml	1	KAZAKHSTAN,

4. Did your laboratory produce vaccines?

Yes

5. Did your laboratory supply vaccines to WOAH Members?

Yes

Vaccine name	Amount supplied nationally (ml, mg)	Amount supplied nationally (ml, mg)	Name of recipient WOAH Members
Adsorbed FMD vaccine	contract	contract	AFGHANISTAN ARMENIA BANGLADESH EGYPT IRAN JORDAN KAZAKHSTAN LEBANON MOROCCO PAKISTAN SAUDI ARABIA UGANDA
Emulsion ARRIAH-VAC polyvalent FMD vaccine	contract	contract	GEORGIA KOREA (REP. OF) PAKISTAN VIETNAM

TOR3: NEW PROCEDURES

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

Yes

Name of the new test or diagnostic method developed	Description and References (Publication, website, etc.)
Method for differentiating FMDV genome of Serotype O production strains by analyzing maximum melting temperature (Tm) of amplicons using green intercalating stain YO-PRO-1 IODIDE.	Russian Patent No. 2 832 768, issued January 9, 2025 / Doronin M.I., Mikhalishin D.V., Mudrak N.S., Guseva M.N., Borisov A.V., Okovytaya T.V., Razgulyayeva E.A., Gochmuradov Y.M. // Application No. 2023128329, filed November 2, 2023.
Method for differentiating SAT-2/XIV genotype from other FMDV Serotype SAT-2 genotypes based on single nucleotide polymorphism using allele-specific amplification of a target genomic region.	Russian Patent No. 2 834 239, issued February 4, 2025 / Doronin M.I., Mikhalishin D.V., Borisov A.V., Silantyeva E.A. // Application No. 2024122994, filed August 12, 2024.
Method for differentiating FMDV genome of Serotype Asia-1 production strains by analyzing peak melting temperature of PCR products using far-red fluorescent stain TO-TAP-3.	Russian Patent No. 2 834 261, issued February 4, 2025 / Doronin M.I., Mikhalishin D.V., Borisov A.V., Guseva M.N., Klyukina N.D., Razgulyayeva E.A., Voevodina M.E., Medvedeva N.N. // Application No. 2024115456, filed June 5, 2024.
Method for differentiating FMDV genome of Serotype SAT-1 production strains using high-resolution melting curve analysis of PCR products with green fluorescent stain LUCS 13.	Russian Patent No. 2,836,871, issued March 24, 2025 / Doronin M.I., Mikhalishin D.V., Borisov A.V., Mudrak N.S., Zhbanova T.V., Okovytaya T.V., Guseva M.N., Ruchnova O.I. // Application No. 2024119664, filed July 12, 2024.
Method for differentiating A/ARRIAH/2015 strain (Genotype A/ASIA/G-VII) from production strains of other FMDV Serotype A genotypes in vaccine raw materials, using single nucleotide polymorphism (SNP) analysis.	Russian Patent No. 2,843,375, issued July 14, 2025 / Doronin M.I., Mikhalishin D.V., Gochmuradov Y.M., Ruchnova O.I., Budina O.O. // Application No. 2024124536, filed August 22, 2024.
Liquid-phase blocking ELISA test kit (LPB-ELISA) for detection of antibodies to FMDV structural proteins of Genotype A/ASIA/IRAN-05SIS-13	Russian Patent No. 2,834,234, issued February 4, 2025 / Doronin M.I., Lugovskaya N.N., Mikhalishin D.V., Okovytaya T.V., Borisov A.V., Gochmuradov Y.M., Kharitonova A.A., Razgulyayeva E.A. // Application No. 2024115258, filed June 4, 2024.

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

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

Yes

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

Yes

Name of the new vaccine developed	Description and References (Publication, website, etc)
Culture inactivated adsorbed vaccine against foot-and-mouth disease from SAT-2/XIV/2023 strain, Genotype SAT-2/XIV. The strain was obtained while testing an FMD virus isolate recovered in the Hashemite Kingdom of Jordan in August 2023.	Russian Patent No. 2 835 906, issued March 5, 2025 / Doronin M.I., Mikhalishin D.V., Borisov A.V., Chvala I.A., Voevodina M.E., Guseva M.N., Nikiforov V.V., Fomina S.N. // Application No. 2024121725, filed July 31, 2024.
Culture inactivated emulsion vaccine against foot-and-mouth disease, Genotype A/ASIA/IRAN-05/HER-10. The strain was obtained while testing an FMD virus isolate recovered from cattle in Kazakhstan in 2012.	Russian Patent No. 2 847 812, issued October 15, 2025 / Doronin M.I., Mikhalishin D.V., Nikiforov V.V., Voyevodina M.E., Gochmuradov Y.M., Prokopenko M.A., Silantyeva Ye.A. // Application No. 2024134943, filed November 22, 2024.
Culture monovalent inactivated emulsion vaccine against foot-and-mouth disease virus Serotype O. The strain was obtained while testing an FMD virus isolate (type O) No.2344/Mongolia/2017, recovered in November 2017 from the FMD-diseased cattle in Mongolia.	Russian Patent No. 2 847 820, issued October 15, 2025 / Doronin M.I., Shishkova A.A., Nikiforov V.V. Guseva M.N., Voevodina M.E., Budina O.O., Gochmuradov Y.M. // Application No. 2024136539, filed December 5, 2024.
Culture monovalent inactivated emulsion vaccine against foot-and-mouth disease, Genotype O/EA-2. The strain was obtained while testing an FMD virus isolate, Genotype O/EA-2, recovered from cattle in the Republic of Uganda in 2023.	Patent No. 2 847 822, issued October 22, 2025 / Doronin M.I., Mikhalishin D.V., Nikiforov V.V. Voyevodina M.E., Silantyeva Ye.A., Matveyev I.S., Mayorova T.K. // Application No. 2024136541, filed December 5, 2024.

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
PAKISTAN	2025-02-24	virus isolation, RT-PCR, nucleotide sequencing	3	0

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

Yes

Name of the WOAH Member Country receiving a technical consultancy	Purpose	How the advice was provided
PAKISTAN	Analysis of FMD outbreaks causes in Pakistan and ways to solve problems related to FMD outbreaks in the region	Recommendations on selection of vaccine strains and the use of monovalent vaccines with at least 6.5 PD50 potency to control outbreaks

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
Agreement on Transboundary trade and mitigation of risks related to the spread of transboundary animal diseases between China, Mongolia and Russia	Not defined	Interaction in case of an emergency related to the outbreaks of dangerous diseases, including foot-and-mouth disease	Department of Animal Health under the Ministry of Agriculture and Rural Affairs of the People's Republic of China, General Department of Veterinary Medicine under the Ministry of Food, Agriculture and Light Industry of the Government of Mongolia	CHINA (PEOPLE'S REP. OF) MONGOLIA
Cooperation on the prevention				

and control of foot-and-mouth disease and other transboundary animal diseases between Transcaucasian countries, Russia and Iran (GF-TADs)	Not defined	Exchange of information on outbreaks of diseases, vaccination of animals	European Commission for the Control of Foot-and-Mouth Disease (EuFMD)	ARMENIA AZERBAIJAN GEORGIA IRAN TURKEY
Joint measures of the CIS member states to prevent and control foot-and-mouth disease	until 2030	-	-	ARMENIA AZERBAIJAN BELARUS KAZAKHSTAN KYRGYZSTAN MOLDOVA TAJIKISTAN UKRAINE UZBEKISTAN

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:
- The information is collected online on the Rosselkhoznadzor website in the "Epizootic Situation" section, subsections "Russia" and Foreign Countries http://www.fsvps.ru/fsvps/ya/, http://www.fsvps.ru/fsvps/iac/foreign.html - epidemiological data are used for compilation of the annual forecasts on livestock FMD in the Russian Federation, FMD introduction and spread risk analysis, training webinars.

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:
- The information is collected online on the Rosselkhoznadzor website in the "Epizootic Situation" section, subsections "Russia" and Foreign Countries http://www.fsvps.ru/fsvps/ya/, http://www.fsvps.ru/fsvps/iac/foreign.html - epidemiological data are used for compilation of the annual forecasts on livestock FMD in the Russian Federation, FMD introduction and spread risk analysis, training webinars.

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:

6

1. The Presence of Two Distinct Lineages of the Foot-And-Mouth Disease Virus Type A in Russia in 2013–2014 Has Significant Implications for the Epidemiology of the Virus in the Region / V. V. Nikiforov, S. A. Noskov, A. V. Sprygin, M. A. Alhussen, A. S. Krylova, T. V. Erofeeva, S. N. Fomina, S. R. Kremenchugskaya, F. I. Korennoy, M. V. Patrushev, I. A. Chvala, T. K. Mayorova, S. V. Toshchakov //Viruses 2025, 17, 8 https://doi.org/10.3390/v17010008

2. An Effective Method for Eliminating Foot-and-Mouth Disease Outbreaks / D. V. Mikhalishin, Y.S. Yelkina, Y.M. Gochmuradov, M.I. Doronin, M.N. Guseva // Veterinary Medicine. - 2025. - No. 1. – pp. 10-14.

3. Effects of the Defoamer Sofexil-1520A on the Proliferation of BHK-21/SUSP/ARRIAH Cells and the Replication of Foot-and-Mouth Disease Virus / Klyukina N.D., Doronin M.I., Guseva M.N., Gochmuradov Y.M. G., Okovytaya T. V., Kalachev N. A. // Actual Questions of Veterinary Biology. 2025. № 1 (65). pp. 40-48.

4. Evaluation of Antibody-Mediated Immunity Induced by Saponin-Adjuvanted, Inactivated Emulsion Vaccines / Doronin M.I., Borisov A. V., Shishkova A. A., Mikhalishin D. V., Guseva M. N., Razumova A. A., Sharypov A. S. // Actual Questions of Veterinary Biology. 2025. № 1 (65). pp. 31-39.

5. A Mathematical Model Based on the Double Differential of Crossing Point Data to Determine FMDV Infectivity Titers in Production Seed Lots during Viral cDNA Amplification / Doronin M.I., Kara D.I., Borisov A.V. Shishkova A.A., Guseva M.N., Matveyev I.S., Silantyeva Ye.A. // Actual Questions of Veterinary Biology. 2025. № 2 (66). pp. 31-40.

6. Shmelev A. A., Nikiforov V. V., Fomina S. N., Spiridonov A. N., Chvala I. FMD under Control: Enhanced FMD Surveillance in the Russian Federation Results in the WOAH Official Recognition of Zone Western Siberia - Urals as FMD-Free // Veterinary Science Today. – 2025. – Vol. 14, No. 4. – pp. 337-343.

b) International conferences:

2
1. Impact of the 2013–2014 FMD Serotype A Epizootic in the Russian Federation on Improvement of Vaccine-Based Disease Prevention / Nikiforov V. V., Fomina S. N., Chvala I.A., Korennoy F.I., Galkina T.S., Sprygin A.V. Proceedings of the International Scientific and Practical Conference "120 Years of Kazakh Veterinary Science: Achievements and New Challenges in Ensuring Biological Security," dedicated to the 120th anniversary of the Kazakh Research Veterinary Institute. Almaty – Almaty – TOO "KazNIVI," 2025. – p. 435.
2. Analysing Circulation of the African FMDV Serotype SAT-2, Improving Surveillance and Specific Prevention Related to the Risk of Introducing an Exotic Serotype into the Russian Federation / Soloshenko A.K., Shmelev A.A., Nikiforov V.V., Fomina S.N. // XII International Scientific and Practical Conference "Molecular Diagnostics", Proceedings. Moscow, 2025, p. 311.

c) National conferences:

1
1. Studying an Oncolytic Virus in the Context of Improving Differential Diagnosis of Foot-and-Mouth Disease / Soloshenko A. K, Shmelev A. A., Fomina S. N., Nikiforov V. V. Viral Infections – From Diagnosis to Clinical signs: Proceedings of abstracts for the All-Russian Conference of Young Scientists, dedicated to the 80th Anniversary of the Birth of Academician of the Russian Academy of Sciences O. I. Kiselev, St. Petersburg, April 10-11, 2025 – St. Petersburg : POLYTECH PRESS, 2025. – p. 67.

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

1
1. http://www.fsvps.ru/fsvps/iac

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 : 4

b) Seminars : 2

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
A	GUINEA	4
A	IRAQ	3
A	CENTRAL AFRICAN (REP.)	6
A	BOSNIA AND HERZEGOVINA	5
B	PAKISTAN	80
C	RUSSIA	7

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
GOST ISO/IEC 17025-2019	CERTIFICATE PDF	Аттестат ЛДЦ из ФГИС.pdf
GOST R ISO 9001-2015	CERTIFICATE PDF	24г Сертиф ИСО 9001 англ. яз _pdf.pdf
GOST ISO/IEC 17043-2013	CERTIFICATE PDF	RA.RU.430258 от 29.01.2026.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Virus isolation	National accreditation system "Federal accreditation service" (RusAccreditation)
FMDV antigen detection ELISA	National accreditation system "Federal accreditation service" (RusAccreditation)
FMDV antigen detection CFT	National accreditation system "Federal accreditation service" (RusAccreditation)
FMD antibody detection LPB ELISA	National accreditation system "Federal accreditation service" (RusAccreditation)
FMDV NSP antibody detection	National accreditation system "Federal accreditation service" (RusAccreditation)
FMDV genome RT-PCR	National accreditation system "Federal accreditation service" (RusAccreditation)

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

Yes

The laboratory complies with the biosafety standards for handling Pathogenicity group II agents that are compatible with biosafety level 3 (BSL-3)

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
Seminar on procedures for official recognition of the WOAH status, approval of official control programs, and maintenance of foot-and-mouth disease and peste des petits ruminants (PPR) disease-free status.	2025-02-26	Issyk-Kul, Kyrgyzstan	Speaker	"Information on fulfillment of obligations of the WOAH foot-and-mouth disease reference laboratory"
International webinar on the foot-and-mouth disease spread in certain EU Member States.	2025-04-06	on-line	participants	-
International Scientific and Practical Conference "120 Years of Kazakh Veterinary Science: Achievements and New Challenges in Ensuring Biological Security"	2025-05-15	Almaty, Kazakhstan	Speaker	"Impact of the FMD Serotype A epizootic on advancement of vaccine-based prophylaxis in Russia"
47th Regular Meeting of the Intergovernmental Council for Veterinary Cooperation of the CIS Member States	2025-10-22	Dushanbe, Tadjikistan	Speaker	Results of joint measures implemented by the CIS Member States to prevent and control foot-and-mouth disease, avian influenza, and Newcastle disease for the period up to 2025.
20th Annual Meeting of the FAO/WOAH Foot-and-Mouth Disease Reference Laboratory Network	2025-10-22	Istanbul, Türkiye (videoconference call)	Speaker	2025 Performance Results of the FGBI "ARRIAH", acting in the capacity of the WOAH Reference Laboratory and the FAO/WOAH Reference Centre for Foot-and-Mouth Disease.
Regional meeting on foot-and-mouth disease and peste des	2025-11-10	Dushanbe, Tadjikistan	Speaker, participation in discussions	Molecular and Epizootiological Characteristics and Risks of Introducing Exotic FMDV Serotypes SAT-1 and SAT-2" on early detection, diagnosis,

petits ruminants control.				transboundary coordination, monitoring, and vaccination against foot-and-mouth disease.
WOAH Workshop on Accelerating the Implementation of a Joint Action Plan for the One Health Concept in Veterinary Services in the European Region	2025-11-17	Athens, Greece	participant	participation in the discussion of a joint action plan for the One Health concept in veterinary services of the European Region

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 Network of FMD Laboratories	participant	3	20th annual meeting of the FAO/WOAH Reference Laboratory Network on Foot-and-mouth disease, Istanbul, Türkiye

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
The interlaboratory comparison	participant	-	WOAH Reference Laboratory for Foot-and-Mouth Disease and Vesicular Stomatitis PANAFTOSA, Brazil – organiser

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
Molecular epidemiology of foot-and-mouth disease outbreaks	Exchange with FMDV genome sequences according to the Memorandum of understanding of the WOAH/FAO FMD Network	FMD WRL (Pirbright, 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
Specificity of FMD diagnostic methods	ORGANIZER	11	antibody detection ELISA	ARMENIA, BELARUS, KAZAKHSTAN, KYRGYZSTAN, MOLDOVA, MONGOLIA, RUSSIA, TAJIKISTAN, UZBEKISTAN,

TOR12: EXPERT CONSULTANTS

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

No

29. Additional comments regarding your report:

No