OIE Reference Laboratory Reports Activities

Activities in 2021

This report has been submitted : 2022-01-18 19:12:52

Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Foot and mouth disease
Address of laboratory:	National Centre for Foreign Animal Disease Canadian Food Inspection Agency Canadian Science Centre for Human and Animal Health 1015 Arlington Street, Suite T2300 Winnipeg Manitoba R3E 3M4 CANADA
Tel.:	+1-204 789.20.23
Fax:	+1-204 789.20.38
E-mail address:	charles.nfon@inspection.gc.ca
Website:	https://merlin.cfia-acia.inspection.gc.ca/eng
Name (including Title) of Head of Laboratory (Responsible Official):	Dr. John Pasick, Executive Director CFIA- National Centre for Foreign Animal Disease
Name (including Title and Position) of OIE Reference Expert:	Charles Nfon; Research Scientist/Head, Vesicular Diseases Unit
Which of the following defines your laboratory? Check all that apply:	Governmental

ToR 1: To use, promote and disseminate diagnostic methods validated according to OIE Standards

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 OIE Manual (Yes/No)	Total number of test performed last year	
Indirect diagnostic tests		Nationally	Internationally
3ABC ELISA	Yes	0	1060
Solid Phase Competitive ELISA (SPCE)	Yes	0	480
Direct diagnostic tests		Nationally	Internationally
Real-Time RT-PCR	Yes	6	1428
Virus Isolation	Yes	4	
VP1 Sequence	Yes		14
Full Genome Sequence	No		366
Lateral Flow Strip Test - Antigen	No		180

ToR 2: To develop reference material in accordance with OIE requirements, and implement and promote the application of OIE Standards.
To store and distribute to national laboratories biological reference products and any other reagents used in the diagnosis and control of the designated pathogens or disease.

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

No

3. Did your laboratory supply standard reference reagents (non OIE-approved) and/or other diagnostic reagents to OIE Member Countries?

Yes

Type of reagent available	Related diagnostic test	Produced/ provide	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	No. of recipient OIE Member Countries	Region of recipients
Recombinant FMDV 3ABC antigen	3ABC ELISA	Produce/Provide	0	2 mL	1	☒Africa ☐Americas ☐Asia and Pacific ☐Europe ☐Middle East
HRP-conjugated anti-FMD 3B monoclonal antibody	3ABC ELISA	Produce/Provide	0	8 mL	1	☒Africa ☐Americas ☐Asia and Pacific ☐Europe ☐Middle East
Rabbit anti-FMDV polclonal sera (serotypes A, O, SAT1 and SAT2)	Solid Phase Competitive ELISA (SPCE) and antigen detection ELISA (AgELISA)	Produce/Provide	0	20 mL (5 mL of each serotype)	1	☒Africa ☐Americas ☐Asia and Pacific ☐Europe ☐Middle East
Guinea pig anti-FMDV polyclonal sera (serotypes A, O, SAT1 and SAT2)	Solid Phase Competitive ELISA (SPCE) and antigen detection ELISA (AgELISA)	Produce/Provide	0	190 mL (50mL each for O, SAT1 &S SAT2, 40 mL for A)	1	☒Africa ☐Americas ☐Asia and Pacific ☐Europe ☐Middle East
Anti-Guinea Pig IgG Conjugate	Solid Phase Competitive ELISA (SPCE) and antigen detection ELISA (AgELISA)	Provide	0	2 mL	1	☒Africa ☐Americas ☐Asia and Pacific ☐Europe ☐Middle East
BEI-inactivated FMDV Antigens (Serotype A, O, SAT1 & SAT2)	Solid Phase Competitive ELISA (SPCE)	Produced/Provide	0	190 mL (50 mL A, O, SAT2, 40 mL SAT1)	1	☒Africa ☐Americas ☐Asia and Pacific ☐Europe ☐Middle East

Positive control bovine sera for 3ABC ELISA	3ABC ELISA	Produce/Provide	0	2 mL	1	☒Africa ☐Americas ☐Asia and Pacific ☐Europe ☐Middle East
FMDV RRT-PCR Primers/Probes/Positive control	RRT-PCR	Produce/Provide	0	1.35 mL each of primers, probe and 2 vials positive control	1	☒Africa ☐Americas ☐Asia and Pacific ☐Europe ☐Middle East
Beta-Actin Primers/Probe Mix and Positive Control	RRT-PCR	Produce/Provide	0	1.35 mL each of primers, probe and 2 vials positive control	1	☒Africa ☐Americas ☐Asia and Pacific ☐Europe ☐Middle East
Purified anti FMDV monoclonal antibodies all serotypes A, O, C, Asia 1, SAT1, SAT2, SAT3) and panserotype	Lateral Flow Strip Test	Produce/Provide	0	10 different monoclonals, 2-1 mL vials of each at 2 mg/mL so a total of 60 mg	2	☒Africa ☐Americas ☐Asia and Pacific ☒Europe ☐Middle East
Hybridoma producing anti-FMD monoclonal antibody all 7 serotypes and panserotype	Lateral Flow Strip Test	Produce/Provide	0	42 mL	1	☐Africa ☐Americas ☐Asia and Pacific ☒Europe ☐Middle East
Hybridoma producing anti-FMD monoclonal antibody FMDV O, ASIA1	Solid Phase Competitive ELISA (SPCE)	Produce/Provide	0	8 mL	1	☐Africa ☒Americas ☐Asia and Pacific ☐Europe ☐Middle East

unpurified anti-FMD monoclonal antibody FMDV O, ASIA1	Solid Phase Competitive ELISA (SPCE)	Produce/Provide	0	20 mL	1	☐Africa ☒Americas ☐Asia and Pacific ☐Europe ☐Middle East
Bovine Serum from Vaccine Challenge Study (Trivalent Vaccine Two A serotypes and and O	Virus Neutralization Assay	Produce/Provide	0	42 samples for a total of 154 mL	1	☐Africa ☐Americas ☒Asia and Pacific ☐Europe ☐Middle East

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to OIE Member Countries?

No

ToR 3: To develop, standardise and validate, according to OIE Standards, new procedures for diagnosis and control of the designated pathogens or diseases

6. Did your laboratory develop new diagnostic methods validated according to OIE Standards for the designated pathogen or disease?

Yes

7. Did your laboratory develop new vaccines according to OIE Standards for the designated pathogen or disease?

No

Name of the new test or diagnostic method or vaccine developed	Description and References (Publication, website, etc.)
Foot-and-Mouth Disease Virus 3ABC Blocking ELISA	Update to the currently in use 3ABC ELISA where two amendments were introduced, 1. A blocking step with the control and test sera 2. Conjugated the 3B monoclonal antibody with horseradish peroxidase.

ToR 4: To provide diagnostic testing facilities, and, where appropriate, scientific and technical advice on disease control measures to OIE Member Countries

8. Did your laboratory carry out diagnostic testing for other OIE Member Countries?

Yes

Name of OIE Member Country seeking assistance	Date (month)	No. samples received for provision of diagnostic support	No. samples received for provision of confirmatory diagnoses
NIGERIA	December 2020	1060 sera	0
NIGERIA	December 2020	69 swine meat juice samples	0
NIGERIA	December 2020	396 bovine meat juice samples	0
NIGERIA	December 2020	179 tissues	0
NIGERIA			0

9. Did your laboratory provide expert advice in technical consultancies on the request of an OIE Member Country?

Yes

Name of the OIE Member Country receiving a technical consultancy	Purpose	How the advice was provided
NIGERIA	FMD Diagnosis	Zoom meetings-2021-02-03, emails-daily, telephone-regularly, presentations through MS teams-2021-11-16, print out of test sent by emails weekly, photographs by whatapp- regularly and protocols adapted for use in this setting
BOTSWANA	Design room temperature-stable strip tests for FMD	Brainstorming meetings with scientists and industry

ToR 5: To carry out and/or coordinate scientific and technical studies in collaboration with other laboratories, centres or organisations

10. Did your laboratory participate in international scientific studies in collaboration with OIE Member Countries other than the own?

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	OIE Member Countries involved other than your country
Comparative studies for Foot and Mouth Disease virus diagnostics and vaccines in Cattle	2.5 years (ongoing)	Validation of FMD serological assay; identification of efficacious FMD vaccine	Animal and Plant Quarantine Agency	KOREA (REP. OF)
Development of rapid lateral flow strip tests for the detection of (1) foot-and-mouth disease virus (FMDV) serotype SAT 1, 2, 3, and (2) antibodies against FMDV nonstructural proteins	5 years (ongoing)	Development of rapid field deployable assays for FMD detection	Botswana Institute for Technology Research and Innovation	BOTSWANA
Capacity building for National and Regional Foot-and-Mouth- Disease Control Strategy in Nigeria (2019 - 2022)	4 years (ongoing)	Sustainable diagnostic capacity building	National Veterinary Research Institute (NVRI), Vom	NIGERIA
Development and evaluation of a rapid point-of-care test using a universal capture ligand for foot-and-mouth disease diagnosis	2 years (ongoing)	Development of a pan-serotype strip test for FMDV	World Reference Laboratory for FMD, The Pirbright Institute	UNITED KINGDOM

ToR 6: To collect, process, analyse, publish and disseminate epizootiological data relevant to the designated pathogens or diseases

11. Did your Laboratory collect epizootiological data relevant to international disease control?

Yes

If the answer is yes, please provide details of the data collected:
Clinical samples from various parts of Nigeria were analyzed and FMDV serotypes/subtypes circulating in the country were identified by VP1 and full genome sequencing. In addition, serum samples were tested to estimate the seroprevalence of FMD. Since FMD is a transboundary animal disease, with a regional control strategy, this information from Nigeria will be relevant for the West African region.

12. Did your laboratory disseminate epizootiological data that had been processed and analysed?

Yes

If the answer is yes, please provide details of the data collected:
Data from #11 above was shared with Nigeria, World Reference Laboratory for FMD in Pirbright, OIE and FAO. Specifically, phylogenetic trees of the FMD sequences were generated and shared. Data was published in Microbiology Resource Announcements

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

a) Articles published in peer-reviewed journals: 1
Fomenky B, Hole K, Ularamu H, Wungak Y, Ehizibolo D, Nebroski M, Kruczkiewicz P, Buchanan C, Lung O, Nfon C. Molecular Characterization of Southern African Territories 2 (SAT2) Serotype of Foot-and-Mouth Disease Virus from Nigeria in 2017 to 2018. Microbiol Resour Announc. 2021 Jul 8;10(27):e0036221. doi: 10.1128/MRA.00362-21. Epub 2021 Jul 8. PMID: 34236230; PMCID: PMC8265221.

b) International conferences: 2
Scientific meeting of the Global Foot and Mouth Disease Research Alliance
Buenos Aires, Argentina | November 1 -3, 2021

GFRA-EuFMD Regional meeting: FMDV in America
The control of Foot-and-Mouth Disease in America from risk analysis to vaccine banks

Virtual OIE/FAO FMD Reference Laboratories Network Meeting, December 2021

International Symposium on Sustainable Animal Production and Health – Current Status and Way Forward; organized by the International Atomic Energy Agency (IAEA); 28 June to 2 July 2021

c) National conferences: 0

d) Other:
(Provide website address or link to appropriate information) 0

ToR 7: To provide scientific and technical training for personnel from OIE Member Countries
To recommend the prescribed and alternative tests or vaccines as OIE Standards

14. Did your laboratory provide scientific and technical training to laboratory personnel from other OIE Member Countries?

Yes

a) Technical visits: 0
b) Seminars: 2
c) Hands-on training courses: 0
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
Training on FMDV Serology (NSP and Serotype Specific ELISAs)	Nigeria	5
Training for FMDV RRT-PCR	Nigeria	5

ToR 8: To maintain a system of quality assurance, biosafety and biosecurity relevant for the pathogen and the disease concerned

15. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)
ISO/IEC 17025	ASB_CTF_15579-CFIA-Certificate_v1_2021-04-27.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Vesicular Diseases: Virus Isolation by Inoculation of Tissue Culture	Standards Council of Canada
Vesicular Disease Viral Antigen Detection by the Double Antibody Sandwich Enzyme-Linked Immunosorbent Assay (ELISA) Test	Standards Council of Canada
Solid Phase Competitive ELISA for Detection of Antibodies to Foot and Mouth Disease Virus Structural Proteins	Standards Council of Canada
Virus Neutralization Test (VNT) for the Detection of Antibodies to Foot-and-Mouth Disease Virus	Standards Council of Canada
3ABC Competitive ELISA for Detection of Antibodies to Foot and Mouth Disease Virus Non-structural proteins	Standards Council of Canada
Real Time Reverse Transcription Polymerase Chain Reaction (PCR) for the Detection of Foot -and-Mouth Disease Virus (FMDV)	Standards Council of Canada
FMDV VP1 and full genome sequencing	Standards Council of Canada

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

Yes

(See Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, Chapter 1.1.4)

ToR 9: To organise and participate in scientific meetings on behalf of the OIE

18. Did your laboratory organise scientific meetings on behalf of the OIE?

No

19. Did your laboratory participate in scientific meetings on behalf of the OIE?

No

ToR 10: To establish and maintain a network with other OIE Reference Laboratories designated for the same pathogen or disease and organise regular inter-laboratory proficiency testing to ensure comparability of results

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

Yes

21. Was your laboratory involved in maintaining a network with OIE Reference Laboratories designated for the same pathogen or disease by organising or participating in proficiency tests?

Yes

Purpose of the proficiency tests: [1]	Role of your Reference Laboratory (organiser/ participant)	No. participants	Participating OIE Ref. Labs/ organising OIE Ref. Lab.
FMD proficiency test scheme	Participant	4	Organizer: World Reference Laboratory for FMD
FMD and vesicular stomatitis proficiency test scheme	Participant	4	Organizer: PANAFTOSA, Brazil

[1] *validation of a diagnostic protocol: specify the test; quality control of vaccines: specify the vaccine type, etc.*

22. Did your laboratory collaborate with other OIE 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 OIE Reference Laboratories
Comparative studies for Foot and Mouth Disease virus diagnostics and vaccines in Cattle	FMD serological diagnostics and FMD vaccine matching/efficacy testing	Animal and Plant Quarantine Agency, South Korea
Development and evaluation of a rapid point-of-care test using a universal capture ligand for foot-and-mouth disease diagnosis	To develop a lateral flow test strip test for the detection of all FMDV serotypes	The Pirbright Institute

ToR 11: To organise inter-laboratory proficiency testing with laboratories other than OIE Reference Laboratories for the same pathogens and diseases to ensure equivalence of results

23. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than OIE Reference Laboratories for the same disease?

No

Note: See Interlaboratory test comparisons in: Laboratory Proficiency Testing at: http://www.oie.int/en/our-scientific-expertise/reference-laboratories/proficiency-testing see point 1.3

ToR 12: To place expert consultants at the disposal of the OIE

24. Did your laboratory place expert consultants at the disposal of the OIE?

Yes

Kind of consultancy	Location	Subject (facultative)
Review of the FMDV Chapter of the OIE Manual	Winnipeg, MB, Canada	FMDV

25. Additional comments regarding your report:

Many of our research and diagnostic activities have been continually affected by the ongoing COVID-19 pandemic. This includes shut-downs of the laboratory and employees working in shortened shift conditions. Shipping of reagents to external labs and receiving of samples from these labs has also been affected with shipping companies delaying the receipt of reagents and samples. Either the shipments are too expensive or they take too long to get to their destination and may be compromised in quality if stored improperly. The samples that were received from Nigeria for FMD testing have not been fully analyzed because of the restrictions put in place the reduce the spread of COVID-19 in Canada. Hands-on training activities continue to not be an option in 2021. Unfortunately, restrictions in travel to Canada started in March 2020 and in-lab training is still restricted. However, virtual training has been conducted using Zoom and MS Teams. Hands-on

training activities will be rescheduled once the pandemic resolves.