WOAH Reference Laboratory Reports Activities 2022

Activities in 2022

This report has been submitted : 25 avril 2023 16:01

Laboratory Information

Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:	Foot and mouth disease
Address of laboratory:	1015 Arlington Street, Winnipeg, MB, Canada, R3E 3M4
Tel.:	12047892023
E-mail address:	charles.nfon@inspection.gc.ca
Website:	https://inspection.canada.ca/science-and-research/our-laboratories/ncfad-winnipeg/eng/1549576575939/1549576643836
Name (including Title) of Head of Laboratory (Responsible Official):	Dr Charles Nfon, Laboratory Executive Director
Name (including Title and Position) of WOAH Reference Expert:	Dr Charles Nfon, Laboratory Executive Director and Reference Lab Expert for foot and mouth disease
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
FMD-NS 3ABC cELISA	Yes	66	0

Direct diagnostic tests		Nationally	Internationally
FMDV isolation	Yes	31	5
FMDV real-time RT-PCR	Yes	243	20
FMDV sequencing/NGS	Yes	0	20

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
Primers and probe	FMDV 3D real-time RT-PCR	provided			1	Africa
Primers and probes	FMDV O-EA3 real-time RT-PCR	provided			1	Africa
Primers and probe	FMDV SAT2 topotype VII real-time RT-PCR	provided			1	Africa
LyoRNA kits from BioMeme	FMDV 3D real-time RT-PCR	provided		6 plates	1	Africa

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAH Members?

No

TOR3: NEW PROCEDURES

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

Yes

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

Yes

NAME OF THE NEW TEST OR DIAGNOSTIC METHOD DEVELOPED	DESCRIPTION AND REFERENCES (PUBLICATION, WEBSITE, ETC.)
Reverse-transcriptase, real-time PCR assays to distinguish the Southern African Territories (SAT) serotypes 1 and 3 and topotype VII of SAT2 of Foot-and-Mouth Disease Virus	Front Vet Sci . 2022 Sep 20;9:977761. doi: 10.3389/fvets.2022.977761. eCollection 2022.

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

No

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

No

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
GHANA	2022-05-12	FMDV 3D real-time RT-PCR; virus isolation; full genome/VP1 sequencing	20	20

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
GHANA	Molecular detection of FMDV	Protocols and training.
NIGERIA	Diagnostic capacity building for FMDV detection	Training, provision of reagents and equipment; protocols

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
Development of rapid lateral flow strip tests for the detection of (1) foot-andmouth disease virus (FMDV) serotype SAT 1, 2, 3, and (2) antibodies against FMDV nonstructural proteins	7 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	Sustainable diagnostic capacity building	National Veterinary Research Institute (NVRI), Vom	NIGERIA

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:
Clinical samples from Ghana were analyzed and FMDV serotypes/subtypes circulating in the country were identified by VP1 and full genome sequencing. Since FMD is a transboundary animal disease, with a regional control strategy, this information from Ghana will be relevant for the West African region.

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 from #14 above was shared with Ghana, World Reference Laboratory for FMD in Pirbright, WOAH and FAO.

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:

1

1. Investigation into the protective ability of monovalent and bivalent A Malaysia 97 and A22 Iraq 64 vaccine strains against infection with an A/Asia/SEA-97 variant in pigs. Horsington J, Singanallur Balasubramanian N, Nfon CK, Bittner H, Vosloo W.Front Vet Sci. 2022 Oct 28;9:1027556. doi: 10.3389/fvets.2022.1027556. eCollection 2022.

2. Development of reverse-transcriptase, real-time PCR assays to distinguish the Southern African Territories (SAT) serotypes 1 and 3 and topotype VII of SAT2 of Foot-and-Mouth Disease Virus. Chestley T, Sroga P, Nebroski M, Hole K, Ularamu H, Lung O, Nfon C.

3. Combining a Universal Capture Ligand and Pan-Serotype Monoclonal Antibody to Develop a Pan-Serotype Lateral Flow Strip Test for Foot-and-Mouth Disease Virus Detection. Yang M, Zhmendak D, Mioulet V, King DP, Burman A, Nfon CK. Viruses. 2022 Apr 10;14(4):785. doi: 10.3390/v14040785

4. Identification of diffusion routes of O/EA-3 topotype of foot-and-mouth disease virus in Africa and Western Asia between 1974 and 2019 - a phylogeographic analysis. Canini L, Blaise-Boisseau S, Nardo AD, Shaw AE, Romey A, Relmy A, Bernelin-Cottet C, Salomez AL, Haegeman A, Ularamu H, Madani H, Ouoba BL, Zerbo HL, Souare ML, Boke CY, Eldaghayes I, Dayhum A, Ebou MH, Abouchoaib N, Sghaier S, Lefebvre D, DeClercq K, Milouet V, Brocchi E, Pezzoni G, Nfon C, King D, Durand B, Knowles N, Kassimi LB, Benfrid S. Transbound Emerg Dis. 2022 Sep;69(5):e2230-e2239. doi: 10.1111/tbed.14562. Epub 2022 Jun 3.

5. Detection of antibodies to structural proteins of foot-and-mouth disease virus in swine meat juice. Yeo S, Yang M, Nyachoti M, Nfon C. Can J Vet Res. 2022 Apr;86(2):147-152.

6. Validation of a competitive enzyme-linked immunosorbent assay to improve the serological diagnosis of swine vesicular disease. Yang M, McIntyre L, Xu W, Brocchi E, Grazioli S, Hooper-McGrevy K, Nfon C. Can J Vet Res. 2022 Apr;86(2):157-161.

b) International conferences:

2

c) National conferences:

4

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

3

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 : 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	4
Training for FMDV RRT-PCR	Nigeria	4

TOR8: QUALITY ASSURANCE

18. 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

19. 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

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

Yes

· The Government of Canada's Canadian Biosafety Standard (CBS) requires that a biosecurity plan be in place for facilities that handle infectious agents. This plan details the aspects the facility has in place for the prevention of theft, misuse or intentional release of pathogens. The National Centre for Foreign Animal Disease (NCFAD) Biosecurity Plan addresses the requirements that are outlined in Section 4.1.8 of the CBS 3rd Edition, and security requirements detailed in Public Health Agency Canada (PHAC)'s Physical Security Standard for the NCFAD at the Canadian Science Centre for Human and Animal Health (CSCHAH) · The NCFAD Biosecurity Plan deals with all biological pathogens, including Risk Group 2, but its focus is on those in Risk Groups 3 and 4, which pose the greatest biosecurity risk. This plan includes details on the risk assessment of biological agents, physical protection of the facility, personnel suitability/reliability, information management, pathogen accountability and inventory, and incident and emergency response measures. · Work areas covered include diagnostic and research laboratory spaces in Containment Level 3 (CL3), a large animal CL3-Ag zone including post mortem suite, and higher containment laboratories, namely restricted zoonotic CL3 and CL4 labs. CL4 space includes a CL4 large animal zone. · The NCFAD Biosecurity Plan is reviewed biennially by the Director and/or Laboratory Executive Director (LED). Ad hoc review takes place in response to incident review outcomes and related document updates such as the Biosecurity Risk Assessment or Threat Risk Assessment.

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 (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
CFIA Animal Health Science Webinar	2022-05-25	Virtual	Speaker	Development of rapid, sensitive and cost-effective Foot-and-Mouth Disease Virus diagnostic tools
GFRA seminar series	2022-11-17	virtual	Participant	Relationship between neutralizing and opsonizing monoclonal antibodies against foot-and-mouth disease virus
EuFMD open session 2022	2022-10-26	virtual	Participant	Digitization and innovation applied to the prevention and control of FAST diseases
GFRA seminar series	2022-08-31	virtual	Participant	Persistent Progress on the Carrier Conundrums of FMDV
GFRA seminar series	2023-10-13	virtual	Participant	WO(AH)W Gold is not precious anymore in

				diagnostic test development
WOAH/FAO FMD Reference Lab Network meeting	2022-11-27	Lelystad, Netherlands	Speaker, session chair	Update on NCFAD 2022 FMD Reference Lab activities

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

PURPOSE OF THE PROFICIENCY TESTS: 1	ROLE OF YOUR REFERENCE LABORATORY (ORGANISER/ PARTICIPANT)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS/ ORGANISING WOAH REF. LAB.
WOAH/FAO FMD Reference Laboratories Network			

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

Yes

PURPOSE OF THE PROFICIENCY TESTS: 1	ROLE OF YOUR REFERENCE LABORATORY (ORGANISER/ PARTICIPANT)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS/ ORGANISING WOAH REF. LAB.
Confirm proficiency in FMDV isolation, real-time RT-PCR, antigen ELISA, NS 3ABC cELISA, serotyping cELISA, VNT, sequencing	Participant		WRLFMD
Confirm proficiency in FMDV isolation, real-time RT-PCR, antigen ELISA, and sequencing	Participant		Botswana Vaccine Institute

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
VI. Development and evaluation of a rapid point-of-care test using a universal capture ligand for foot-and-mouth disease diagnosis	Rapid point-of-care test for FMDV antigen detection	World Reference Laboratory for FMD, 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?

No

TOR12: EXPERT CONSULTANTS

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

Yes

KIND OF CONSULTANCY	Location	SUBJECT (FACULTATIVE)
Document review	Virtual	Review of chapters of the WOAH Terrestrial manual and code

29. Additional comments regarding your report:

Yes

Many of our research and diagnostic activities were still affected by the COVID-19 pandemic in 2022. Shipping of reagents to external labs and receiving of samples from these were affected. 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.