OIE Reference Laboratory Reports Activities

Activities in 2020

This report has been submitted : 2021-01-05 09:00:37

Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Contagious bovine pleuropneumonia
Address of laboratory:	Via Campo Boario 64100 Teramo ITALY
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Name (including Title) of Head of Laboratory (Responsible Official):	Dr Nicola D'Alterio
Name (including Title and Position) of OIE Reference Expert:	Dr Massimo Scacchia,DVM, Official Veterinarian
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
CFT	Yes	0	47
Direct diagnostic tests		Nationally	Internationally

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?

Yes

NOTE: Currently, there are 22 laboratories that produce Standard Reference Reagents officially recognised by the OIE for 19 diseases/pathogens. Please click the following link to the list of OIE-approved International Standard Sera: http://www.oie.int/en/our-scientific-expertise/veterinary-products/reference-reagents/. If the reagent is not listed on this page, it is NOT considered OIE-approved. The next two questions allow you to indicate non-OIE-approved diagnostic reagents.

Disease	Test	Available from
Contagious bovine pleuropneumonia	Both irradiated and non-irradiated sera are available. Please contact the Reference Laboratory (Dr Pini) for advice on their suitability for different types of serological test (complement fixation test, indirect or competitive enzyme-linked immunosorbent assay)	Dr Massimo Scacchia CESME, Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise 'G. Caporale', Via Campo Boario, 64100 Teramo, Italy Tel: (39-0861) 33.24.05 Fax: (39-0861) 33.22.51 m.scacchia@izs.it

Type of reagent available	Related diagnostic test	Produced/ Supply imported	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	Name of recipient OIE Member Countries
Positive serum	CFT	Produced	◉<10mL ○10-100mL ○100-500mL ○>500mL	◉<10mL ○10-100mL ○100-500mL ○>500mL	ZAMBIA
Antigen	CFT	Produced	◉<10mL ○10-100mL ○100-500mL ○>500mL	◉<10mL ○10-100mL ○100-500mL ○>500mL	ZAMBIA
Antigen	CFT	Produced	◉<10mL ○10-100mL ○100-500mL ○>500mL	◉<10mL ○10-100mL ○100-500mL ○>500mL	BOTSWANA

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
Antigen	CFT	Produced	0	20 ml	2	☒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.)
Improvement of NGS analyses for a deep molecular characterisation of Mmm strains	The OIE Reference Laboratory established protocols for NGS analyses for a deep molecular characterisation of Mmm strains to be applied for functional and evolutionary studies and epidemiological investigations.

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?

No

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
BOTSWANA	Networking on CBPP, with BNVL CBPP OIE Reference Laboratory and African veterinary institutions in order to; Improve diagnostic activities, Carry out technical training and Stimulate scientific research	ERFAN - Enhancing Research for Africa Network;CBPP Working Group online meetings
ANGOLA	Networking on CBPP, with other OIE Reference Laboratories and African veterinary institutions in order to; Improve diagnostic activities, Carry out technical training and Stimulate scientific research	ERFAN - Enhancing Research for Africa Network;CBPP Working Group online meetings
ZAMBIA	Networking on CBPP, with other OIE Reference Laboratories and African veterinary institutions in order to; Improve diagnostic activities, Carry out technical training and Stimulate scientific research	ERFAN - Enhancing Research for Africa Network;CBPP Working Group online meetings
NAMIBIA	Networking on CBPP, with other OIE Reference Laboratories and African veterinary institutions in order to; Improve diagnostic activities, Carry out technical training and Stimulate scientific research	ERFAN - Enhancing Research for Africa Network;CBPP Working Group online meetings
TANZANIA	Networking on CBPP, with other OIE Reference Laboratories and African veterinary institutions in order to; Improve diagnostic activities, Carry out technical training and Stimulate scientific research	ERFAN - Enhancing Research for Africa Network;CBPP Working Group online meetings
SENEGAL	Networking on CBPP, with other OIE Reference Laboratories and African veterinary institutions in order to; Improve diagnostic activities, Carry out technical training and Stimulate scientific research	ERFAN - Enhancing Research for Africa Network;CBPP Working Group online meetings
MAURITANIA	Networking on CBPP, with other OIE Reference Laboratories and African veterinary institutions in order to; Improve diagnostic activities, Carry out technical training and Stimulate scientific research	ERFAN - Enhancing Research for Africa Network;CBPP Working Group online meetings
ETHIOPIA	Networking on CBPP, with other OIE Reference Laboratories and African veterinary institutions in order to; Improve diagnostic activities, Carry out technical training and Stimulate scientific research	OIE Twinning Project on CBPP; online meetings

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
Phylogenetic study of Mmm strains in SADC Region. PhD Research study	3 years	Characterize Mmm strains using last generation molecular techniques and link them to a defined geographical region. PhD Research study	National Veterinary Laboratory, Gaborone Veterinary School –Teramo University, Italy	BOTSWANA
Pathogenic studies of Mmm. PhD Research study	3 years	Study of interaction between Mmm and host cells using OMIC approach	NVL Gaborone, Veterinary School –Teramo University, Italy	BOTSWANA
Pathogenic studies of CCPP. PhD Research study	3 years	Study of interaction between Mccp and host cells using Immunohistochemistry and Confocal microscopy	National Veterinary Laboratory, Gaborone Veterinary School –Teramo University, Italy	BOTSWANA

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:
The OIE Reference Laboratory for CBPP in Teramo has always supported OIE member countries with epidemiological studies, analysing data on the prevalence and incidence of CBPP in their countries. No such epidemiological support was requested in 2020.

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:
In agreement with member countries that have provided data on CBPP in their countries. Normally this activity gives the opportunity to write publications together with African colleagues.

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: 3
1. Di Teodoro G, Marruchella G, Di Provvido A, D'Angelo AR, Orsini G, Di Giuseppe P, Sacchini F, Scacchia M. Contagious Bovine Pleuropneumonia: A Comprehensive Overview. Vet Pathol. 2020 Jul;57(4):476-489. doi: 10.1177/0300985820921818. Epub 2020 May 11. PMID: 32390522.

2. Di Federico M, Ancora M, Luciani M, Krasteva I, Sacchini F, Orsini G, Di Febo T, Di Lollo V, Mattioli M, Scacchia M, Marruchella G and Cammà C (2020) Pro-Inflammatory Response of Bovine Polymorphonuclear Cells Induced by Mycoplasma mycoides subsp. mycoides. Front. Vet. Sci. 7:142. doi: 10.3389/fvets.2020.00142.

3. Sacchini, F., Liljander, A.M., Heller, M. et al. Reproduction of contagious bovine pleuropneumonia via aerosol-based challenge with Mycoplasma mycoides subsp. mycoides. Acta Vet Scand 62, 62 (2020). https://doi.org/10.1186/s13028-020-00560-0

b) International conferences: 0

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: 8
c) Hands-on training courses: 3
d) Internships (>1 month): 1

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	Mozambique	2
c	Ethiopia	1
d	Botswana	1
b	BOTSWANA, ZAMBIA, NAMIBIA, ANGOLA, TANZANIA, Senegal and Mauritania	7
b	Ethiopia	12

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 17025	Certificato ACCREDIA.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
CFT	ILAC-ACCREDIA
Immunoblotting	ILAC-ACCREDIA
PRC-RFLP	ILAC-ACCREDIA

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?

Yes

National/ International	Title of event	Co-organiser	Date (mm/yy)	Location	No. Participants
International	ERFAN WG meetings - First round	31 ERFAN partners	07-08/2020	Online	40
International	ERFAN WG meetings - Second round	ERFAN partners	11-12/2020	Online	37
International	OIE Twinning project on CBPP - NAHDIC Ethiopia	NAHDIC Ethiopia	10-11/2020	Online	12

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.
CBPP c-ELISA	Participant	Unknown	CIRAD-France

[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
OIE ERFAN Project - Enhancing Research for Africa Network SADC Region CBPP Working group	Strengthening research in African countries through the support of OIE Reference Laboratories/Collaboration Centres	Botswana National Veterinary Laboratory, IZS Palermo, Italy (Contagious Agalactiae OIE Reference Laboratory)
OIE ERFAN Project - Enhancing Research for Africa Network North West Africa Small Ruminants Mycoplasmosis Working group	Strengthening research in African countries through the support of OIE Reference Laboratories/Collaboration Centres	IZS Palermo, Italy (Contagious Agalactiae OIE Reference Laboratory)

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)
OIE CBPP ad hoc group meetings participation	OIE Headquarter	Evaluation of CBPP status of OIE Members

25. Additional comments regarding your report:

OIE Twinning Project on CBPP
OIE Twinning Project on CBPP - Strengthening the capacity of Contagious Bovine Pleuro-Pneumonia (CBPP) diagnosis including development of reagents for serological tests and enhance disease surveillance in Ethiopia and East Africa.
Laboratories involved: Parental Laboratory, OIE CBPP Reference Laboratory at Istituto Zooprofilattico

Sperimentale dell'Abruzzo e del Molise, Teramo, Italy (IZSAM); Candidate Laboratory, National Animal Health Diagnostic and Investigation Centre, Sebeta, Ethiopia (NAHDIC).

Kick off meeting

The Kick off meeting of the OIE Twinning Project at the IZSAM in Teramo was organized from 10 to 12 December 2019. The event was attended by seven colleagues from NAHDIC, including the Ethiopian CVO and OIE delegate Dr Anbessie Alemayehu Mekonnen.

Guest was the Ethiopian Ambassador in Italy Her Excellency Mrs Zenebu Tadesse. During the Kick off meeting, the training periods that NAHDIC colleagues will carry out at the IZSAM have been defined.

Training Period on Serology

From the 3rd to the 21st of February 2020, Mr Teferi Benti Moti, from NAHDIC carried out a period of training at the Parent Laboratory.

After that training period, due to the Coronavirus Pandemic and in agreement with the Candidate Laboratory, the remaining training activities were suspended for at least 12 months.

Once the Coronavirus pandemic will be mitigated, the activities, described in the project concerning, training and audits will be reprogrammed with the Ethiopian partner.

Meeting online

Considering the continuation of the COVID-19 pandemic, in order to not decrease the IZSAM support to NAHDIC staff, online meetings have been planned.

This approach aims to: schedule online meetings where IZSAM and NAHDIC experts recap the activities already done at IZSAM on specific topics; define together which topics shall be taken more into consideration during the training periods at IZSAM; identify the activities to carry out at NAHDIC that could be more useful once arrived at IZSAM.

Meetings, of up to one and a half hours, have been organised weekly.

Below is the online meetings list:

13 October 2020; Topic: Biotechnology. 23 October 2020; Topic: Molecular Biology, Genomics and Bioinformatics. 27 October 2020; Topic: Antigen Production. 3 November 2020; Topic: Bacteriology.10 November 2020; Topic: Serology, status of art. 17 November 2020; Topic: Research Activities

The online meetings allowed NAHDIC colleagues to receive technical informations and SOPs on the areas covered in the meetings. In particular, didactic material and/or SOP concerning the following topics were described and delivered to NAHDIC colleagues:

- Iconographic collection of gross lesions characterising CBPP;
- Methods of collecting biological material;
- Isolation procedure and traditional and molecular biology typing of Mmm;
- Mmm NGS study and bioinformatics approach;
- Serological diagnosis ;
- Production of media ;
- Production of Mmm antigen for CFT.

Consideration

The Candidate Laboratory showed a high interest in participating in this new approach, which took into account online meetings while waiting to restart training activities in physical presence.

The Candidate Laboratory also, following the indications of the Parental Laboratory, started to collect biological material that will be partly processed at the OIE Reference Laboratory in Teramo during their future training periods.

Next step

Online meetings will be organised starting from February 2021 with the aim of presenting the NAHDIC laboratory facilities to the colleagues from the OIE Reference Laboratory in Teramo. As soon as the sanitary situation allows, the training periods to be carried out by NAHDIC colleagues in Teramo will be rescheduled.

Enhancing Research for Africa Network -ERFAN

The project "Enhancing Research for Africa Network -ERFAN" is an OIE project, funded in April 2019 and involves 31 Veterinary Institutions, 25 African and 6 Italian.

It is based on the positive experience and high scientific value of the Twinning Projects funded by the World Organisation for Animal Health (OIE) and carried out by IZSAM in collaboration with several African countries in the fields of Vector-borne diseases, Food hygiene, CBPP, Animal welfare and Brucellosis. The OIE twinning tool has created a link between IZSAM and the National Veterinary Laboratories involved, facilitating the exchange of knowledge, ideas and experience and improving their diagnostic capabilities. One of the main objectives of the ERFAN project was to give continuity to these scientific activities, adding research proposals, at regional level, in the specific fields of interest. In 2020 due to the COVID-19 pandemic, regular meetings, which are essential for networking, and training courses were conducted online.

PhD student

CBPP-Veterinary student
The IZSAM activated and financed, in collaboration with the Faculty of Veterinary Medicine in Teramo, a PhD for a veterinary from the National Veterinary Laboratory in Gaborone, Botswana. The research project for the PhD student was focused on the phylogenetic and biomolecular epidemiology study to be carried out on Mmm strains isolated in the southern region of Africa. More specifically, the activities, now in their second year, involve the collection of Mmm isolates from some African countries and their phylogenetic study by means of NGS sequencing in addition to bioinformatics analysis to assess any factors of antibiotic resistance.
Within the framework of the PhD, research activities continued on bovine lung explants for the study of certain aspects related to the pathogenesis of CBPP, in full compliance with and implementation of the 3Rs.
In order to assess the host-pathogen interaction in the early stages of infection, a study of gene expression (based on RT-qPCR assays) and protein expression (Immunoblotting analysis) of pro-inflammatory cytokines and mediators of inflammation was carried out on an in vitro model of neutrophil cultures and an ex vivo model of bovine lung tissue explants. By analysing the data from the two experimental models, it was possible to understand the changes induced by Mmm in terms of the expression of selected target genes (n=7) involved in the inflammatory process.
A genomic database of Mmm strains created in 2019 obtained by sequencing is available.
Contagious caprine Pleuropneumonia-CCPP
In addition to the bovine PPCB model, a system of respiratory tissue explants such as trachea, bronchi and lungs from the goat species was developed for pathogenetic studies with Mycoplasma capricolum subsp. capripneumoniae, the aetiological agent of the CCPP, which is exotic in Italy but widely spread in Africa and the Middle East. Immunohistochemistry tests were conducted to investigate the ability of Mccp to adhere to and infect different portions of the respiratory tract.

CBPP- Biotechnologist student
Research activities within the framework of a PhD on Cellular and Molecular Biotechnologies were continued and finalised.
The topic studied was: Contagious Bovine Pleuropneumonia: molecular basis of host-pathogen interactions in the early stage of the inflammatory response, PhD Thesis in Cellular and Molecular Biotechnologies XXXII cycle, University of Teramo- Scientific Tutor: Massimo Ancora.

Others activities
During the period August-October 2020, two experts from CESME and the OIE CBPP Reference Laboratory, provided advice and technical support to the Ministry of Health for the preparation and submission to the OIE of the Dossier for the recognition of Italy officially free of Contagious Bovine Pleuropneumonia.