

## OIE Reference Laboratory annual reports (RINDERPEST)

### Activities in 2021

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### A: Maintaining Scientific and Technical Skills

1. Did your laboratory perform relevant diagnostic tests for purposes such as disease, diagnosis, screening of animals for export, surveillance, etc. (not for quality control, proficiency testing or staff training)
  - a. For the specified disease?
  - b. For closely related diseases or pathogens?

Disease	Diagnostic Test	Indicated in OIE Manual (Yes/No)	Total number of tests performed last year	
			Nationally	Internationally
Rinderpest	No			
Peste des petits ruminants	C-ELISA	Yes	846	20
“	SNT	Yes	0	144
	Realt-time RT-PCR	Yes	645	9
“	RT-PCR	Yes	0	2

Disease	Diagnostic Test	Indicated in OIE Manual (Yes/No)	Total number of tests performed last year	
			Nationally	Internationally
Peste des petits ruminants	Partial sequencing	Yes	0	2
“	Full genome sequencing	Yes	93	8

2. Did your laboratory produce, supply, or import standard reference reagents officially recognised by the OIE for the specified disease or for closely related diseases? **No**

Type of Reagent Available	Related diagnostic test	Produced/Supplied/Imported	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	Name of recipient OIE member countries

3. Did your laboratory supply, exchange or receive standard reference reagents and/or other diagnostic reagents for the specified disease: **No**

Type of reagent	Related diagnostic test	Supplied by your lab, exchanged or received	Amount	Name of recipient or supplier member country

4. Did your laboratory provide expert advice in technical consultancies on the request of an OIE Member Country for the specified disease or for closely related diseases? **Yes for PPR**

Name of the OIE member country receiving the technical consultancy	Purpose	How the advice was provided
NIGERIA	Vaccine production and QC, diagnostic methods	face-to-face meeting, evaluation based on documents and PT results
EGYPT	PPRV sequencing, request for vaccine master seed	email exchanges, drafting collaboration proposal, vaccine production guideline

Name of the OIE member country receiving the technical consultancy	Purpose	How the advice was provided
BANGLADESH	Request for vaccine master seed	email exchanges, vaccine production guideline
THAILAND	Confirmatory diagnosis, shipment of samples	email exchanges, collaboration agreement, documents for shipment
SEYCHELLES	PPR diagnosis, shipment of samples	email exchanges, collaboration agreement, documents for shipment and storage of samples

5. What method of dissemination of information is most often used by your laboratory? (please provide information on activities for other diseases relevant to maintaining capability for specified disease) [a: Articles published in peer-reviewed journals; b: International conferences; c: National conferences; d: Other]

a) Articles published in peer-reviewed journals: 7

- Tounkara, K., Kwiatek, O., Sidibe, C. A. K., Sery, A., Dakouo, M., Salami, H., Lo, M. M., Ba, A., Diop, M., Niang, M., Libeau, G., & Bataille, A. (2021). Persistence of the historical lineage I of West Africa against the ongoing spread of the Asian lineage of peste des petits ruminants virus. *Transboundary and Emerging Diseases*, n/a(n/a). doi:<https://doi.org/10.1111/tbed.14066>
- Mantip, S., Sigismeau, A., Shamaki, D., Woma, T. Y., Kwiatek, O., Libeau, G., Farougou, S., & Bataille, A. (2021). Molecular epidemiology of peste des petits ruminants virus in Nigeria: an update. *Transboundary and Emerging Diseases*, n/a(n/a). doi:<https://doi.org/10.1111/tbed.14073>
- Jones, B. A., Mahapatra, M., Mdetele, D., Keyyu, J., Gakuya, F., Eblate, E., Lekool, I., Limo, C., Ndiwa, J. N., Hongo, P., Wanda, J. S., Shilinde, L., Mdaki, M., Benfield, C., Parekh, K., Mayora Neto, M., Ndeereh, D., Misinzo, G., Makange, M. R., Caron, A., Bataille, A., Libeau, G., Guendouz, S., Swai, E. S., Nyasebwa, O., Koyie, S. L., Oyas, H., Parida, S., & Kock, R. (2021). Peste des Petits Ruminants Virus Infection at the Wildlife–Livestock Interface in the Greater Serengeti Ecosystem, 2015–2019. *Viruses*, 13(5), 838.
- Eloiflin, R.-J., Auray, G., Python, S., Rodrigues, V., Seveno, M., Urbach, S., El Koulali, K., Holzmuller, P., Totte, P., Libeau, G., Bataille, A., & Summerfield, A. (2021). Identification of Differential Responses of Goat PBMCs to PPRV Virulence Using a Multi-Omics Approach. *Frontiers in Immunology*, 12(4063). doi:[10.3389/fimmu.2021.745315](https://doi.org/10.3389/fimmu.2021.745315)
- Benfield, C. T. O., Hill, S., Shatar, M., Shiilegdamba, E., Damdinjav, B., Fine, A., Willett, B., Kock, R., & Bataille, A. (2021). Molecular epidemiology of peste des petits ruminants virus emergence in critically endangered Mongolian saiga antelope and other wild ungulates. *Virus Evolution*. doi:[10.1093/ve/veab062](https://doi.org/10.1093/ve/veab062)
- Bataille, A., Salami, H., Seck, I., Lo, M. M., Ba, A., Diop, M., Sall, B., Faye, C., Lo, M., Kaba, L., Sidime, Y., Keyra, M., Diallo, A. O. S., Niang, M., Sidibe, C. A. K., Sery, A., Dakouo, M., El Mamy, A. B., El Arbi, A. S., Barry, Y., Isselmou, E., Habiboullah, H., Lella, A. S., Doumbia, B., Gueya, M. B., Coste, C., Squarzoni Diaw, C., Kwiatek, O., Libeau, G., & Apolloni, A. (2021). Combining viral genetic and animal mobility network data to unravel peste des petits ruminants transmission dynamics in West Africa. *PLoS Pathogens*, doi:[10.1371/journal.ppat.1009397](https://doi.org/10.1371/journal.ppat.1009397)
- Mantip, S. E., Sigismeau, A., Nanven, M., Joel, A., Qasim, A.

M., Aliyu, S., Musa, I., Ezeanyika, O., Faramade, I., Ahmed, G., Woma, T. Y., Shamaki, D., Libeau, G., Farougou, S., & Bataille, A. (2021). Wide circulation of peste des petits ruminants virus in sheep and goats across Nigeria. 2021, 88(1). doi:10.4102/ojvr.v88i1.1899

b) International conferences: 5

1- EEID, June 2021 - Combining viral genetic and animal mobility network data to unravel peste des petits ruminants transmission dynamics in West Africa - poster online 2- European Veterinary Immunology Workshop , August 2021 - In vitro and in vivo study of the immune response of Saanen goats to infection with PPR - oral presentation – online 3- PPR GREN meeting, dec 2021 - updates on vaccine activities and serology method validation - oral – online 4- PPR vaccine producers meeting, dec 2021 - updates on vaccine activities and serology method validation – oral 5- EURL annual workshop - oct 2021 - 1) results of PT 2) update on PPR situation 3) updates on cELISA 4) PPRV evolution in Mongolia - oral - online

c) National conferences: 2

1- KIMRIVE,, Montpellier sept 2021 - 1) projet Lidiski 2) Réponse du système immunitaire de la chèvre au virus de la peste des petits ruminants - oral

2\_ Phylomap, Paris Oct 2021 - Epidémiologie évolutive du virus de la peste des petits ruminants (genre : Morbillivirus) - oral

d) Other:

(Provide website address or link to appropriate information) 5

1- <https://eurl-ppr.cirad.fr/>

2- <https://www.ppr-labs-oie-network.org/>

3- Etude de la variation génétique intra hôte du virus de la peste des petits ruminants par le biais des NGS. Léa Jaillot. 2021. Master thesis, Aix-Marseille University

4- Etude in vitro de l'infection des monocytes, cellules dendritiques et macrophages de chèvre par le virus de la peste des petits ruminants. Vincent Lasserre; 2021. Master thesis, Montpellier University

5- Etude de la virulence du virus de la Peste des Petits Ruminants en relation avec la variabilité de la réponse de l'hôte. Roger-Junior Eloiflin; 2021. PhD thesis, Montpellier University

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

Yes

No

7. Did your laboratory implement activities to ensure ongoing capability for the designated disease or closely related disease in the event of loss of the key staff including the OIE Reference Expert? **For PPR**

Activity	Description
PPR OIE Ref Laboratory and RP OIE Ref Laboratory	<p>Activities related to both these references will be maintained on the long run, after the leave of the actual key expert, thanks to the support provided by Dr Arnaud Bataille. In addition to him, several CIRAD scientists are currently contributing to scientific knowledge on PPR and rinderpest and have skills in the domain of virology, molecular epidemiology, development of new diagnostic tools (antibody-, antigen-, and nucleic-acid-based tests) as well as new vaccines and their validation. The extensive experience in the field of PPR molecular biology and serology in the approach of standardization of assays must be considered a key element for rinderpest expertise. In addition, the PPR staff implements the routine operation of diagnosis under quality assurance and proficiency testing enabling test comparison, an important component of test validation. The group has also established a sequence database to study the phylogenetic relationship between PPRV isolates and RP isolates (in the frame of the Sequence and Destroy project). The main activities and expertise implemented in majority for PPR are as described below:</p>
Diagnosis	<p>For PPRV, routine performance of diagnostic tests (C-ELISA, real-time PCR, RT-PCR, VNT, isolation, sequencing, sequence analysis).</p> <p>For RPV sequencing performed in the frame of the Sequence and Destroy project, sequence analysis maintained.</p> <p>Sharing of Standard Operating Procedures (SOPs) of ISO/IEC 17025 accredited methods.</p> <p>Sharing best practices and maintaining a high quality performance for reference laboratories</p>
Control and maintenance of biological materials for PPRV and RPV	<p>Maintain reagents and reference material collections (positive controls for diagnostic tests ; production of an Internal Reference Material for batch to batch C-ELISA control and PT implementation; sharing of live and inactivated PPR strains; and SLAM cells.</p> <p>For PPRV, hold the collection of samples containing PPRV, collated from different geographical locations, isolated strains and of vaccine strains.</p> <p>Maintain the seed strain of PPRV Nigeria 75/1 vaccine strain</p> <p>Maintain the seed strain of rinderpest RBOK vaccine strain and others</p>

Activity	Description
Expertise	Providing scientific and technical assistance to organisations and countries and in support to regional control programmes; Networking with OIE reference laboratories and with NRLs for PPR; Networking with Rinderpest holding facilities.
Rinderpest vaccine production	Production and maintenance of a reserve of quality-assured stocks of RBOK rinderpest live vaccine strain; The reserve of quality-assured vaccine is made available in case of rinderpest re-emergence upon request of FAO

## B: Laboratory Systems

8. Does your laboratory have a Quality Management System certified according to an International Standard? If YES indicate the name of the quality management system adopted or currently in place. Also attach a scanned certificate of the system.

ISO 17025

9. Is your laboratory accredited by an international accreditation body? If 'yes' indicate test for which your laboratory is accredited and name of the accreditation body.

PPR C-ELISA, COFRAC

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

Yes

No

11. Does your laboratory have a biosecurity system in place to ensure security for the pathogen and materials that may contain the infectious pathogen?

Yes

No

## C: Capability to Respond to a Suspected Case

12. In the last year, did your laboratory perform diagnostic tests for the specified pathogen and the disease in order to confirm ongoing capability?

Diagnostic Test	Indicated in OIE Manual (Yes/No)	Total number of tests performed last year
RT-real time PCR	NO	0
PCR	YES	6
Viral titration	YES	6
Cell culture (CPE visualisation and vaccine production)	YES	6
Full genome sequencing	YES	2

See comments § 27

13. Did your laboratory produce vaccines for the specified disease or similar diseases?

Disease	Amount supplied nationally or internationally
Rinderpest	0
PPR	3 countries: Bangladesh, Egypt, France X 10 vials of 10 <sup>4</sup> TCID <sub>50</sub>

14. Did your laboratory organise or participate in inter-laboratory proficiency tests with any other laboratories for the specified disease or similar diseases?

Role of your laboratory (organiser or participant)	Disease	Test	Number of participating laboratories	Regions of participating OIE member countries
Organiser	PPR	Serology and virology	43	EU, Non-EU

## D: Networks and Linkages

15. Did your laboratory organise or participate in scientific meetings for the specified disease?

Title of event	Date	Location	Role (Organiser, speaker, presenter)	Title of work presented
OIE/FAO holding facilities networking meeting	18 <sup>th</sup> May 2021, 3 <sup>rd</sup> December 2021	Visio conference	speaker	Updates from CIRAD
Ad hoc consultative call of the FAO-OIE Rinderpest Joint Advisory Committee	26 <sup>th</sup> October 2021	Visio conference	speaker	no
Rinderpest Lab Interviews	23 <sup>rd</sup> August 2021	Join Zoom Meeting	speaker	Laboratory Questionnaire
EFSA Working Group meeting AHL and control measures – Rinderpest	4 <sup>th</sup> June, 16 <sup>th</sup> Sept, 3 <sup>rd</sup> Nov 2021	Visio conference	speaker	Expertise on diagnostic and vaccines

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

Yes

No

17. Was your laboratory involved in maintaining a network with OIE Reference Laboratories designated for the same pathogen or disease?

Yes

No

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

Yes

No



19. Did your laboratory carry out activities to raise awareness and improve capability for this disease in other member countries? **No**

Description of activity	Date	Member countries

### E: Biosafety

20. What level of biocontainment is used in your laboratory for (a) storage and (b) handling of potentially infectious material for the specified disease?

CIRAD facility was recommended by the FAO-OIE rinderpest Joint Advisory Committee to be designed as RHF, and was approved in May 2019 at the 87th OIE General Session to be a RHF category A and B. All laboratory activities are carried out in the facility either at BSL-3+ or BSL-2 biocontainment. Additionally, CIRAD's facilities are authorized by the French Agency for Health Products (ANSM, equivalent to the FDA) to store and handle selected agents. Rinderpest wild strains are preserved at BSL-3+ level; vaccine strains, comprising the RBOK strain are kept at BSL-2 biocontainment level. For all microorganisms handled, activities are under a quality management system according to ISO 17025, accreditation no. 1-2207, since 1st March 2010

21. Does your laboratory maintain a structured risk assessment for work with potentially infectious material for the specified disease?

Yes  No

22. Was your laboratory's risk assessment for work with potentially infectious material reviewed in the past year?

Yes  No

23. Does your laboratory have an emergency response plan for biosafety incidents involving potentially infectious material for the specified disease?

Yes  No

## F: Research

24. Did your laboratory develop new diagnostic methods for the designated pathogen or disease, or a similar disease? **No**

Disease	Diagnostic Method	Description

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

Title of study	Duration	Purpose of study	Partners (Institutions)	OIE Member Countries Involved other than your Country
Livestock Disease Surveillance Knowledge Intregation (LIDISKI)	4 years	Improving surveillance and control of PPR in Nigeria	CIRAD, IZSve, Ikore, NVRI	ITALY NIGERIA
Epidemiology and Control of Peste des Petits Ruminants (ECO-PPR)	3 years	to inform and support ongoing national, regional and global efforts for PPR control and eradication by generating the necessary evidence to support policy dialogue.	ILRI ISRA LCV CIRDES	BURKINA FASO MALI SENEGAL
Study of virulence of peste des petits ruminants virus in relation to variability of host response	3 years	Study of virulence of peste des petits ruminants virus in relation to variability of host response	IVI Bern	SWITZERLAND
Development of multispecies validated serology protocols for complex ecosystems, focused on East Africa, in support of Global PPR eradication	2.5 years	Development of multispecies validated serology protocols for complex ecosystems, focused on East Africa, in support of Global PPR eradication	RVC, PI, IAEA, U of Glasgow, SACID	AUSTRIA TANZANIA UNITED KINGDOM

Title of study	Duration	Purpose of study	Partners (Institutions)	OIE Member Countries Involved other than your Country
Support Towards the Operationalization of the SADC Regional Agricultural Policy (STOSAR) Project	2.5 years	Specialized services for risk analysis, training and sample testing for the management of PPR	FAO, SADC countries	ANGOLA BOTSWANA COMOROS ESWATINI LESOTHO MADAGASCAR MOZAMBIQUE SEYCHELLES SOUTH AFRICA TANZANIA ZAMBIA ZIMBABWE
OIE twinning LNERV-CIRAD	2 year	Support LNERV to become regional ref lab for PPR	Senegal	SENEGAL

26. 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 or a similar pathogen?

Title of Project or Contract	Scope	Name(s) of relevant OIE Reference Laboratories
Organisation of the network of OIE ref lab for PPR	Organisation of the network of OIE ref lab for PPR	Pirbright, China Animal Health and Epidemiology Center

27. Additional comments regarding your report (if any):

There is no rinderpest vaccine supplied for this year as said in §13, but vaccine production is related to the project 'Preparation of a quality controlled master seed bank of the RBOK rinderpest vaccine strain' in the frame of the mandate of the FAO-OIE Rinderpest Holding Facility category A and B of CIRAD. This project provided an opportunity to prepare from quality controlled vaccine (1) a master seed bank designated to be kept at CIRAD and (2) a production seed for vaccine producers to expand and replenish the reserves in case of an emergency. In relation to §12, the laboratory performed diagnostic tests on RPV vaccine in the frame of the above project.