

OIE Reference Laboratory Reports Activities

Activities in 2021

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Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Rabbit haemorrhagic disease
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Name (including Title) of Head of Laboratory (Responsible Official):	Piero Frazzi, DVM, General Director
Name (including Title and Position) of OIE Reference Expert:	Lorenzo Capucci, BSC,
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	
		Nationally	Internationally
Indirect diagnostic tests		Nationally	Internationally
RHDV Competition ELISA	yes	664	8
RHDV2 Competition ELISA	yes	942	1057
EBHSV Competition ELISA	yes	259	60
RHDV IgA Isotype ELIS	yes	21	73
RHDV IgG Isotype ELIS	yes	0	26
RHDV IgM Isotype ELIS	yes	63	73
Direct diagnostic tests		Nationally	Internationally
RHDV Sandwich ELISA	yes	218	10
EBHSV Sandwich ELISA	yes	162	41
RT-PCR RHDV/RHDV2	yes	6	0
RT-PCR EBHSV	yes	3	0
Genome sequencing	yes	12	0
RT-PCR lagovirus	yes	2	0

**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
RHDV serological kit	c-ELISA	produced	0	4	2	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americ as <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
EBHSV serological kit	c-ELISA	produced	2	11	2	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
RHDV/EBHSV virological kit	MAbs sandwich ELISA	produced	12	19	2	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
RHDV2 serological kit	c-ELISA	produced	0	17	6	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americ as <input checked="" type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
RHDV/RHDV2 Differential kit	MAbs sandwich ELISA	produced	0	2	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East

Monoclonal antibodies	Immunohisto-chemistry and ELISA	produced	0	4	3	<input type="checkbox"/> Africa <input checked="" type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Reference sera for EBHS-serology	c-ELISA	produced	0	10	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East

4. Did your laboratory produce vaccines?

Yes

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?

No

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

No

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
MALTA	apr	2	0
SWEDEN	jan	8	0
SRI LANKA	july	1	0
PORTUGAL	may	33	0
FRANCE	may	8	0
BELGIUM	july	0	416
SPAIN	jan	482	0
FRANCE	jan	91	0
SPAIN	jun	71	0
SPAIN	jun	29	0
GERMANY	jan	97	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
BELGIUM	To check the presence of lagoviruses and manage the control in SPF-like groups of rabbits	VDC meeting, email and analyses of samples
SPAIN	To test the efficacy of vaccines for RHDV in experimental and field conditions. To check the presence and circulation of RHDVs in a rabbit sanctuary	VDC meeting, email and analyses of samples
SRI LANKA	Testing of pet rabbits for international movements	Email and analyses of samples
FRANCE	Technical advice and support for the characterization of RHDV2 strains	VDC meeting, email and analyses of samples
GERMANY	To give information on the epidemiology and diagnosis of RHDV and related viruses	Email and analyses of samples
UNITED STATES OF AMERICA	To give information and support on the epidemiology and diagnosis of RHDV2	Email and collaboration in studies
SWEDEN	To check the presence of lagoviruses in groups of laboratory rabbits	Email and analyses of samples
FRANCE	Data and information on the epidemiological situation of RHDV2 in Europe	Email and VDC meeting
HUNGARY	To support diagnosis of EBHS by giving a panel of reference sera	Email and supply of reference sera
MOROCCO	To give protocol for extraction of RNA and amplification of RHDV from liver homogenate for the detection of RHDV/RHDV2	Email messages

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
PRIMA - LAGMED "Improvement of preventive actions to emerging LAGoviruses in the MEDiterranean basin: development and optimisation of methodologies for pathogen detection and control"	3 years	i) To monitor RHD epidemiology in the Mediterranean basin and perform a genomic characterization of circulating strains, ii) To test and apply biosecurity measures to prevent outbreaks and better contain the disease in the field and in rabbit-production systems, particularly in countries located south to the Mediterranean basin. iii) To advise and train stakeholders and partners in Africa on disease diagnosis and prophylaxis, and technical management.	1.CIBIO/InBIO-UP Portugal 2.INIA Spain 3.Universidad de Córdoba Spain 4.ANSES France 5.ONCFS France 6.INRA-ENVT France 7.ENMV de Sidi Thabet Tunisia 8.ENSV d'Alger Algeria	PORTUGAL
Study of the presence of lagoviruses in micromammals	2 years	To verify the possibility that lagovirus can infect other species than lagomorphs	CITA, Zaragoza, SPAIN	SPAIN

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:

We analyse the genomic and antigenic characteristics of the different pathogenic and non-pathogenic lagovirus strains identified in rabbits, hares and cottontails, mainly in European countries but also in some other parts of the world. The studies are pointed to achieve data on the presence and distribution of lagovirus strains infecting lagomorph species as target species or even as spillover hosts.

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:

Epidemiological data obtained from the examination of samples received from member countries, when indicative of novelty of scientific relevance are usually organised and elaborated in communications at meetings and conferences and for the preparation of scientific papers. Indeed, the participation in international projects and in established scientific collaborations helps in the acquisition and exchange of data and information.

**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: 4

1) ASIN JAVIER, DANIEL REJMANEK, DEANA L. CLIFFORD, ANDREA B. MIKOLON, EILEEN E. HENDERSON, AKINYI C. NYAOKE, MELISSA MACÍAS-RIOSECO, NICOLAS STREITENBERGER, JULIANN BEINGESSER, LESLIE H. WOODS, ANTONIO LAVAZZA, LORENZO CAPUCCI, BEATE CROSSLEY, FRANCISCO A. UZAL. Early circulation of rabbit hemorrhagic disease virus type 2 (RHDV2) in domestic and wild lagomorphs in southern California, USA (2020-2021). *Transboundary and Emerging Diseases*. 1-12. <https://doi.org/10.1111/tbed.14315>

2) CAVADINI PATRIZIA, STEFANO MOLINARI, FRANCESCA MERZONI, ALICE VISMARRA, ANNIKA POSAUTZ, VANESA ALZAGA GIL, MARIO CHIARI, FRANCESCA GIANNINI, LORENZO CAPUCCI, ANTONIO LAVAZZA. Occurrence of the non-pathogenic hare calicivirus (HaCV Lagovirus GII.2) in captive reared and free-living wild hares in Europe. *Transboundary and Emerging Diseases* 68(2) 509-518. <http://dx.doi.org/10.1111/tbed.13706>

3) MOHAMED F., GIDLEWSKI T., BERNINGER M.L., PETROWSKI H.M., BRACHT A.J., DERUEDAC.B., BARRETTE R.W., GRADY M., O'HEARN E.S., LEWIS C.E., MORAN K.E., STURGILL T.L., CAPUCCI L., & ROOT J.J. (2021). Comparative susceptibility of eastern cottontails and New Zealand white rabbits to classical rabbit haemorrhagic disease virus (RHDV) and RHDV2. *Transboundary and Emerging Diseases*, 1-11. <https://doi.org/10.1111/tbed.14381>

4) CALVETE CARLOS, LORENZO CAPUCCI, ANTONIO LAVAZZA, MARÍA P. SARTO, ANTONIO J. CALVO, FERNANDO MONROY, JORGE H. CALVO. Changes in European wild rabbit population dynamics and the epidemiology of rabbit haemorrhagic disease (RHD) in response to artificially increased virus transmission. December 2021 *Transboundary and Emerging Diseases* DOI: 10.1111/tbed.14421

b) International conferences: 4

1) ESTRUCH J, ROUCO C, ABRANTES J, LOPES AM, ALMEIDA T, CAPUCCI L, CAVADINI P, LAVAZZA A, LOPEZ OLVERA JR, NEIMANIS A, RUIZ_OLMO J, VELARDE R. European brown hare syndrome in Catalonia, Spain: from a single event to epizootic? Joint virtual conference 69th WDA, 14th EWDA "Managing wildlife diseases for sustainable ecosystems": Cuenca, August 31 to September 2, 2021. p 372

2) CAPUCCI LORENZO, CAVADINI PATRIZIA, LAVAZZA ANTONIO - Viral haemorrhagic disease: RHDV type 2, ten years later (Invited paper). WRSA - 12th World Rabbit Congress - November 3-5, 2021 - Nantes, France P-00, p.98.

3) BARATELLI M., MOLIST-BADIOLA J., PUIGREDON-FONTANET A., PASCUAL M., BOIX O., MORA-IGUAL F.X., WOODWARD M., LAVAZZA A., CAPUCCI L, 2021. Characterization of the maternal derived antibody immunity against RHDV-2 after administration in breeding does of an inactivated vaccine. 12th World Rabbit Congress - November 3-5, 2021 - Nantes, France, Communication P-05, p.99.

4) CAVADINI P., CAMPISI G., VISMARA A., LAVAZZA A., CAPUCCI L., 2021. Study of genetic evolution of RHDV-2 in Italy from 2011 to 2019. 12th World Rabbit Congress - November 3-5, 2021 - Nantes, France, Communication P-11, p. 100.

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?

No

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)
UNI CEI ENISO/IEC 17025	CERTIFICATO-DI-ACCREDITAMENTO.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
RT_PCR	ILAC MRA, ACCREDIA
Serological Competitive RHDV-ELISA	ILAC MRA, ACCREDIA
Serological Competitive RHDV2-ELISA	ILAC MRA, ACCREDIA
Virological sandwich MAbs RHDV/EBHSV-ELISA	ILAC MRA, ACCREDIA
Immunohistochemistry	ILAC MRA, ACCREDIA
Electron Microscopy negative staining methods	ILAC MRA, 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?

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?

Not applicable (Only OIE Reference Lab. designated for disease)

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?

Not applicable (Only OIE Reference Lab. designated for disease)

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?

Not applicable (Only OIE Reference Lab. designated for disease)

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)
Revision of OIE Standards	On site	We have been asked to revise the draft of the Chapter on RHD of the OIE Terrestrial Manual. This revision was completed at the beginning 2020, when we answered to question and comments of reviewers. The new draft was then finally approved during the last General Session held on May 2021

25. Additional comments regarding your report:

During 2021 the laboratory has applied both nationally and internationally the specific serological and virological test (MAbsELISA for antigen detection, cELISA and isotype_ELISAs for serology and RT PCR) developed towards the RHDV2.

Following the first epidemic occurrence of RHDV2 in North America (USA and Mexico) we had the opportunity to collaborate and support American colleagues for the detection of the virus in wild and domestic lagomorphs. Even more information on pathogenic and non-pathogenic lagoviruses' spread, host susceptibility, and antigenic and genomic characteristics were acquired thanks to the scientific collaboration and research projects with colleagues from various member Countries.

A technical support based mainly on diagnostic activity and providing of reagents and materials was given to different OIE member countries.