

OIE Reference Laboratory Reports Activities

Activities in 2020

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Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Enzootic abortion of ewes (Ovine chlamydiosis)
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Name (including Title) of Head of Laboratory (Responsible Official):	Nicole Borel, Prof. Dr. med. vet., Dipl. ECVP, FVH Pathology
Name (including Title and Position) of OIE Reference Expert:	Nicole Borel, Prof. Dr. med. vet., Dipl. ECVP, FVH Pathology
Which of the following defines your laboratory? Check all that apply:	Academic

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
ELISA (IDEXX Chlamydia)	yes	12	0
ELISA (ID-Vet)	yes	19	0
Direct diagnostic tests		Nationally	Internationally
real-time PCR Chlamydiaceae	yes	638	189
DNA Microarray	yes	9	9
16S rRNA PCR & sequencing	yes	92	13
ompA PCR & sequencing	no	67	0
MLST for C. pecorum	no	18	0
Immunohistochemistry Chlamydiaceae	yes	6	0
SYBRGreen PCR Chlamydia pecorum	no	1712	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
Cell line HeLa, HCjE, LLC-MK2	Zytotoxicity testing, infection study	stored	0	5 mL	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
Chlamydia shuttle vector	Chlamydial transformation	produced	0	15 ul	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
Chromosomal DNA of Chlamydia suis	PCR	produced	0	200 ul	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
Bovine serum samples	validation serology (ELISA)	stored	1 mL	0	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
Chromosomal DNA of C. trachomatis	Validation PCR/new diagnostic tests	produced	100 ul	0	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

FFPE block positive for Chlamydia suis	Validation of immunohistochemistry	stored	0	1 block	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
Chlamydia trachomatis and C. pneumoniae strains in SPG	Validation of new diagnostic test	produced	23 mL	0	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
Chlamydia suis strain in SPG	Isolation of chlamydial strains	produced	0	600 ul	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
Chlamydia abortus standard DNA	positive control for real-time PCR	stored	0	15 ul	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
swab samples positive and negative for Chlamydia suis	infection study	stored	0	30 samples	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
Chlamydia suis qPCR Standard (plasmid)	infection study	produced	0	50 µl	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

Chlamydia suis qPCR Standard (E. coli with plasmid)	infection study	produced	0	1.5 ml	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
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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.)
ompA typing for Chlamydia pecorum	Primers were designed and PCR established in this laboratory (Rohner et al. Submitted)
MLST for Chlamydia pecorum	Method was established according to Jelocnik et al. 2013 (doi:10.1128/JCM.00992-13)
pmp typing for Chlamydia felis (pmp9)	Method was established according to Harley et al. 2007 (doi: 10.1016/j.vetmic.2007.04.022)
C. trachomatis and C. suis specific PCR targeting CDS 2 of the chlamydial plasmid	Primers were designed and PCR established in this laboratory (Rohner et al. Submitted)

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
TURKEY	October	0	20

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

No

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
Chlamydia pecorum in ruminants and pigs	2 years	Research collaboration, method transfer	University of the Sunshine Coast, Queensland	AUSTRALIA
Chlamydia suis in domestic pigs	2 years	Research collaboration, method transfer, transfer of study samples	Department for Farm Animals and Veterinary Public Health, University Clinic for Swine, University of Veterinary Medicine, Vienna	AUSTRIA
Chlamydia in wild mice	2 years	Research collaboration	Department for Evolutionary Biology and Environmental Studies, University of Zurich	SWITZERLAND
Chlamydiaceae in wild and domestic birds	3 years	Research collaboration	National Reference Centre for Poultry and Rabbit Diseases (NRGK), Institute for Food Safety and Hygiene, Vetsuisse Faculty, University of Zurich, Zurich	SWITZERLAND
Origins of tetracycline resistance in Chlamydia suis	3 years	Research collaboration, method/sample transfer	University of Laval, Quebec	CANADA
Identification and characterization of C. abortus/C. psittaci intermediates	1 years	Research collaboration, method transfer	National Veterinary Research Institute, Pulawy	POLAND
Chlamydial transformation	3 years	Research collaboration, method transfer	Lübeck University, Lübeck	GERMANY
Tetracycline resistance in Chlamydia suis	4 years	Research collaboration, method transfer	UCSF Benioff Children's Hospital of Oakland Research Institute, Oakland, CA, USA	UNITED STATES OF AMERICA

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?

No

If the answer is no, please provide a brief explanation of the situation:
The IVPZ only investigated local outbreaks of ovine Chlamydiosis in Switzerland.

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

No

If the answer is no, please provide a brief explanation of the situation:
The disease prevalence for Ovine Chlamydiosis is reported by the Federal Veterinary Office (FVO) in Switzerland.

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: 13

Borel N, Greub G. International Committee on Systematics of Prokaryotes (ICSP) Subcommittee on the taxonomy of Chlamydiae, minutes of the closed meeting, 10 September 2020, via Zoom. *Int J Syst Evol Microbiol.* 2020 Dec 17. doi: 10.1099/ijsem.0.004620. Online ahead of print.

Stalder S, Marti H, Borel N, Mattmann P, Vogler B, Wolfrum N, Albini S. Detection of Chlamydiaceae in Swiss wild birds sampled at a bird rehabilitation centre. *Vet Rec Open.* 2020 Nov 12;7(1):e000437.

Ostfeld N, Islam MM, Jelocnik M, Hilbe M, Sydler T, Hartnack S, Jacobson C, Clune T, Marsh I, Sales N, Polkinghorne A, Borel N. Chlamydia pecorum-Induced Arthritis in Experimentally and Naturally Infected Sheep. *Vet Pathol.* 2020 Nov 19:300985820973461.

Kuratli J, Leonard CA, Nufer L, Marti H, Schoborg R, Borel N. Maraviroc, celastrol and azelastine alter Chlamydia trachomatis development in HeLa cells *J Med Microbiol.* 2020 Nov 12. doi: 10.1099/jmm.0.001267.

Stalder S, Marti H, Borel N, Sachse K, Albini S, Vogler BR. Occurrence of Chlamydiaceae in Raptors and Crows in Switzerland. *Pathogens.* 2020 Sep 2;9(9):E724.

Aumayer H, Leonard CA, Pesch T, Prähauser B, Wunderlin S, Guscetti F, Borel N. Chlamydia suis is associated with intestinal NF- κ B activation in experimentally infected gnotobiotic piglets. *Pathog Dis.* 2020 Aug 1;78(6):ftaa040.

Inic-Kanada A, Stojanovic M, Miljkovic R, Stein E, Filipovic A, Frohns A, Zöller N, Kuratli J, Barisani-Asenbauer T, Borel N. Water-filtered Infrared A and visible light (wIRA/VIS) treatment reduces Chlamydia caviae-induced ocular inflammation and infectious load in a Guinea pig model of inclusion conjunctivitis. *J Photochem Photobiol B.* 2020 Jul 5;209:111953.

Fritschi J, Marti H, Seth-Smith HMB, Aeby S, Greub G, Meli ML, Hofmann-Lehmann R, Mühldorfer K, Stokar-Regenscheit N, Wiederkehr D, Pilo P, Van Den Broek PR, Borel N. Prevalence and phylogeny of Chlamydiae and hemotropic mycoplasma species in captive and free-living bats. *BMC Microbiol.* 2020 Jun 26;20(1):182.

Baumann S, Gurtner C, Marti H, Borel N. Detection of Chlamydia species in 2 cases of equine abortion in Switzerland: a retrospective study from 2000 to 2018 *J Vet Diagn*

Borel N, Sauer-Durand AM, Hartel M, Kuratli J, Vaupel P, Scherr N, Pluschke G. wIRA: Hyperthermia as a Treatment Option for Intracellular Bacteria, With Special Focus on Chlamydiae and Mycobacteria. *Int J Hyperthermia.* 2020;37(1):373-383.

Unterweger C, Schwarz L, Jelocnik M, Borel N, Brunthaler R, Inic-Kanada A, Marti H. Isolation of Tetracycline-Resistant Chlamydia suis From a Pig Herd Affected by Reproductive Disorders and Conjunctivitis Antibiotics (Basel). 2020 Apr 17;9(4):187. doi: 10.3390/antibiotics9040187.

Wahdan A, Rohner L, Marti H, Bacciarini LN, Menegatti C, Di Francesco A, Borel N. PREVALENCE OF CHLAMYDIACEAE AND TETRACYCLINE RESISTANCE GENES IN WILD BOARS OF CENTRAL EUROPE. J Wildl Dis. 2020 Mar 27. doi: 10.7589/2019-11-275.

Laroucau K, Aaziz R, Lécu A, Laidebeure S, Marquis O, Vorimore F, Thierry S, Briend-Marchal A, Miclard J, Izembart A, Borel N, Redon L. A cluster of Chlamydia serpentis cases in captive snakes. Vet Microbiol. 2020 Jan;240:108499. doi: 10.1016/j.vetmic.2019.108499.

b) International conferences: 1

05.-07.02.2020: 18th German Chlamydia Workshop, Lübeck, Germany

c) National conferences: 1

Poster and Networking Day (PaND) of the Vetsuisse Faculty, University of Zurich, Zurich, Switzerland

d) Other:

(Provide website address or link to appropriate information) 1

Sachse K, Borel N. Chapter 17: Recent advances in epidemiology, pathology and immunology of veterinary chlamydiae. In: Chlamydia Biology: from Genome to Disease, edited by M. Tang, J. Hegemann, C. Sütterlin, Caister Academic Press, February 2020.

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: 3

b) Seminars: 3

c) Hands-on training courses: 3

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
a,b,c	Poland	1
a,b,c	Turkey	5
a,b,c	Austria	1

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	Akkreditierung-Urkunde-2020-2025.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Histology, Immunohistochemistry, molecular methods	SAS (Schweizerische Akkreditierungsstelle)

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.
Chlamydia PCR Proficiency Testing in 2019, results in 2020	Participant	6	Avian Chlamydiosis, Enzootic Abortion OIE Reference Laboratory, ANSES, Paris, 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?

No

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?

No

25. Additional comments regarding your report: