World Organisation for Animal Health

Nicole Borel - - SWITZERLAND

WOAH Reference Laboratory Reports Activities 2025

This report has been submitted: 1 février 2026 16:39

LABORATORY INFORMATION

***Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:**	Enzootic abortion ewes (ovine chlamydiosis)
***Address of laboratory:**	Institute of Veterinary Pathology, Vetsuisse Faculty, University of Zurich, Winterthurerstrasse 268, CH-8057 Zurich
***Tel:**	446358563
***E-mail address:**	n.borel@access.uzh.ch
Website:	https://www.vetpathology.uzh.ch/de/forschung/ChlamHealth-Research-Group.html
***Name (including Title) of Head of Laboratory (Responsible Official):**	Prof. Dr. med. vet. Nicole Borel, Dipl. ECVP, FVH Pathology
***Name (including Title and Position) of WOAH Reference Expert:**	Dr. med. vet., Dr. sc. nat. Hanna Marti
***Which of the following defines your laboratory? Check all that apply:**	Academic institution

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
ELISA (IDEXX Chlamydia)	Yes	13	0
ELISA (MVD Enfer Chlamydia abortus)	Yes	76	0
Direct diagnostic tests		Nationally	Internationally
Isolation of Chlamydia	Yes	202	0
Real-time PCR Chlamydiaceae	Yes	568	0
Real-time PCR Chlamydia abortus	Yes	28	0
Real-time PCR Chlamydia suis	No	278	0
Real-time PCR Chlamydia pecorum	No	496	0
16S rRNA PCR & Sequencing	Yes	1	0
OmpA PCR & Typing	No	176	0

Immunohistochemistry for Chlamydia	Yes	10	0

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
Bacterial Stock (SPG)	Cell culture	produced	0	0.1 mL	1	THE NETHERLANDS,

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAH Members?

TOR3: NEW PROCEDURES

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

Yes

Name of the new test or diagnostic method developed	Description and References (Publication, website, etc.)
ompA PCR for Chlamydia suis	Own primer design, part of bachelor thesis, no publication yet

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

No

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

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

TOR4: DIAGNOSTIC TESTING FACILITIES

10. Did your laboratory carry out diagnostic testing for other WOAH Members?

No

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
GERMANY	Clarification regarding the genomic classification of the newly reclassified avian Chlamydia abortus	Remote, via email
AUSTRIA	Data analysis & proper sample preparation for whole-genome sequencing of chlamydiae	Remote, via email and video conference
THE NETHERLANDS	Cell culture expertise for proper preparation of chlamydial stocks	Remote, via email and video conference

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
WOAH Ring Trial, PCR methods to detect Chlamydia abortus	3 years	Improvement of diagnostic methods, collaboration between WOAH reference laboratories	FLI Jena, ANSES Partis, Moredun Research Institute	FRANCE GERMANY UNITED KINGDOM

Chlamydial transformation of veterinary chlamydiae	5 years	Research collaboration	University of California, Los Angeles; Maastricht University; Medical University Vienna	THE NETHERLANDS - ARUBA AUSTRIA UNITED STATES OF AMERICA

13. In exercising your activities, have you identified any regulatory research needs* relevant for WOAH?

Yes

Research need : 1

Please type the Research need: Our laboratory often receives inquiries concerning the viability/durability of Chlamydia abortus in animal products (e.g. wool,milk, semen) and animal waste (feces contaminated with placenta/vaginal fluid). While the literature states that Chlamydia abortus can survive cold temperatures for weeks or even months, there is no systematic study investigating the survival of Chlamydia abortus in the environment.

Relevance for WOAH Disease Control,

Relevance for the Code or Manual Manual,

Field Epidemiology and Surveillance,

Animal Category Terrestrial,

Disease:

Enzootic abortion of ewes (ovine chlamydiosis)

Kind of disease (Zoonosis, Transboundary diseases) Zoonosis,

Additional keywords if needed: One keyword per entry

Viability,Durability,Durability,Shedding

If any, please specify relevance for Codes or Manual, chapter and title

(e.g. Terrestrial Manual Chapter 2.3.5 - Minimum requirements for aseptic production in vaccine manufacture)

Answer: Terrestrial Manual Chapter 3.8.5 - Introduction, 3. Zoonotic Risk and biosafety requirements

Notes:

Answer: Answer: This project is currently ongoing (2023-2026). Results will be published in a peer-reviewed journal.

Research need : 2

Please type the Research need: Data from Australia has shown that Chlamydia pecorum may cause infectious abortion in ruminants, particularly sheep. In an ongoing study, we are testing archived abortion samples from Swiss laboratories for the presence of Chlamydia pecorum to determine Chlamydia pecorum as an additional cause of ruminant abortion.

Relevance for WOAH Disease Control,

Relevance for the Code or Manual Manual,

Field Epidemiology and Surveillance, Diagnostics,

Animal Category Terrestrial,

Disease:

Enzootic abortion of ewes (ovine chlamydiosis)

Kind of disease (Zoonosis, Transboundary diseases) Zoonosis,

If any, please specify relevance for Codes or Manual, chapter and title

(e.g. Terrestrial Manual Chapter 2.3.5 - Minimum requirements for aseptic production in vaccine manufacture)

Answer: Terrestrial Manual Chapter 2.3.5 - Introduction, 2. Nature and classification of the pathogen; Depending on the results, this may impact B. Diagnostic Techniques, Chapter 1.5 Detection of DNA by conventional PCR, real-time PCR and DNA microarray

Notes:

Answer: Answer: This project is currently ongoing (2023-2026). Results will be published in a peer-reviewed journal.

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:
The IVPZ is investigating ovine and caprine abortion cases for Chlamydia abortus by PCR methods as part of the Swiss national surveillance regulation (Art. 129) for notifiable diseases.

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:
The data is centrally recorded by the Federal Veterinary Office (FVO). The IVPZ notifies the cantonal authorities about positive cases. This data is then submitted to the Swiss FVO.

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:

6

1. Ürel H, Benassou S, Marti H, Reska T, Sauerborn E, Pinheiro Alves De Souza Y, Perlas A, Rayo E, Biggel M, Kesselheim S, Borel N, Martin EJ, Venegas CB, Schloter M, Schröder K, Mittelstrass J, Prospero S, Ferguson JM, Urban L. Nanopore- and AI-empowered microbial viability inference. Gigascience. 2025 Jan 6;14:giaf100. doi: 10.1093/gigascience/giaf100.
2. Borel N, Longbottom D, Greub G, Albini S, Vanrompay D, Laroucau K. Zoonotic infections due to avian Chlamydia abortus: what are we missing? Lancet Microbe. 2025 Aug 20:101197. doi: 10.1016/j.lanmic.2025.101197.
3. Rayo E, Malingamba G, Marti H, Onorini D, Leonard CA, Low N, Hampel B, Borel N. Chlamydia trachomatis and Neisseria gonorrhoeae bacterial loads in men who have sex with men on pre-exposure prophylaxis: a cross-sectional study. Sex Transm Infect. 2025 Aug 17:sextrans-2025-056579. doi: 10.1136/sextrans-2025-056579.
4. Fässler N, de Arriba M, Biggel M, Jelocnik M, Borel N, Marti H. Development of shuttle vector-based transformation systems for veterinary and zoonotic chlamydiae Microbiol Spectr. 2025 Jul 23:e0164125. doi: 10.1128/spectrum.01641-25.
5. Schnee C, Laroucau K, Livingstone M, Aaziz R, Marti H, Longbottom D, Borel N. Cross-European laboratory evaluation of commercial and in-house real-time PCR assays for the detection of Chlamydia abortus in small ruminants Res Vet Sci. 2025 Jun;188:105613. doi: 10.1016/j.rvsc.2025.105613.
6. Rayo E, Pesch T, Onorini D, Leonard C, Marti H, Schoborg R, Low N, Hampel B Borel N. Viability assessment of Chlamydia trachomatis in men who have sex with men using molecular and culture methods Clin Microbiol Infect. 2025 Jan 8:S1198-743X(25)00002-3.

b) International conferences:

6

1. Marti H, Seth-Smith H, Bommana S, Read TD, Dean D, Biggel M. The chlamydial invasin as a potential site for DNA integration. 12th Biennial Meeting of the Chlamydia Basic Research Society & 21st German Chlamydia Workshop, Berlin, 2025. (presentation).
2. Rayo E, Onorini D, Leonard C, Marti H, Hampel B, Low N, and Borel N: STI pathogen interactions and viability in men who have sex with men (MSM). Congress of the European Society of Clinical Microbiology and Infectious Diseases, Vienna, Austria, 2025 (presentation, presenting author: Enrique Rayo)
3. Altuntas E, Marti H, Borel N: Impact of different temperatures on Chlamydia abortus survival and infectivity over time. Congress of the European Society of Clinical Microbiology and Infectious Diseases; Vienna, Austria, 2025 (poster, presenting author: Efe Altuntas)
4. Fässler N, Biggel M, Jelocnik M, Marti H, Borel N: Investigating the risk of lateral gene transfer from Chlamydia suis to Chlamydia pecorum. 12th Biennial Meeting of the Chlamydia Basic Research Society & 21st German Chlamydia Workshop, Berlin, 2025. (poster/poster-flash, presenting author: Nicole Borel)
5. De Arriba M, Fässler N, Borel N, Marti H: Exploring inclusion fusion of tetracycline-susceptible and resistant Chlamydia suis strains. 12th Biennial Meeting of the Chlamydia Basic Research Society & 21st German Chlamydia Workshop, Berlin, 2025. (poster/poster-flash, presenting author: Magdalena de Arriba)
6. Sleczkowksa M, Kim J, Marti H, Borel N, Morre SA, Wieringa P: 3D in vitro oviduct-on-a-chip model for investigating tubal fibrosis and Chlamydia trachomatis pathogenesis. 12th Biennial Meeting of the Chlamydia Basic Research Society & 21st German Chlamydia Workshop, Berlin, 2025. (poster/poster-flash, presenting author: Milena Sleczkowska)

c) National conferences:

8

1. Altuntas E, Hicks AJ, Dittman MT, Zumthor JP, Borel N, Marti H. Viability of Chlamydia abortus in the environment – Lessons from an abortion storm at Früebüel. AgroVet-

Strickhof Tagung 2025, Zurich, Switzerland, 2025. (poster).
2. Fässler F, de Arriba M, Biggel M, Jelocnik M, Borel N, Marti H. Development of shuttle vector-based transformation systems for veterinary and zoonotic chlamydiae. Annual Congress of the Swiss Society for Microbiology, Interlaken, Switzerland, 2025. (poster).
3. Zubler D, Marti H, Kratochvil J, Borel N. Detection and isolation of Chlamydia suis in pig feces and manure. AgroVet-Strickhof Tagung 2025, Zurich, Switzerland, 2025. (poster/poster-flash, presenting author: Daphne Zubler).
4. Altuntas E, Hicks AJ, Dittman MT, Zumthor JP, Borel N, Marti H: Impact of different temperatures on Chlamydia abortus survival and infectivity over time. 5th Swiss Young Microbiologists Symposium, Zurich, Switzerland, 2025 (poster/ poster-flash, presenting author: Efe Altuntas)
5. Aksu A, Biggel M, Marti H: Determining the strain diversity of Chlamydia suis using gene-specific Nanopore sequencing. 5th Swiss Young Microbiologists Symposium, Zurich, Switzerland, 2025 (poster/ poster-flash, presenting author: Amine Aksu)
6. De Arriba M, Fässler N, Borel N, Marti H: Investigating the co-infection dynamics between resistant and susceptible strains of the zoonotic pathogen Chlamydia suis in the presence and absence of antibiotic selection. 5th Swiss Young Microbiologists Symposium, Zurich, Switzerland, 2025 (poster/ poster-flash, presenting author: Magdalena de Arriba)
7. De Arriba M, Fässler N, Sturzenegger F, Martins JD, Borel N, Marti H: Exploring inclusion fusion of tetracycline-susceptible and resistant Chlamydia suis strains. 18th MIM (Graduate School program of Microbiology and Immunology) Retreat, Morschach, Switzerland, 2025 (presentation, presenting author: Magdalena de Arriba)
8. Borel N, Marti H, Albini S: ChlamHealth – zoonotische Chlamydieninfektionen, neue Erkenntnisse. 12. Schweizerische Tierärztetage; Basel, Switzerland, 2025 (presentation, presenting author: Nicole Borel)

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

3
Homepage:
https://www.vetpathology.uzh.ch/de/forschung/ChlamHealth-Research-Group.html

LinkedIn:
https://www.linkedin.com/company/74165915

Invited Talk:
2025. Marti H, Albini S. Viel Neues an der Chlamydienfront.Koordinationssitzung des BLV mit den anerkannten Diagnostik- und Referenzlaboratorien sowie den veterinär-pathologischen Instituten vom 19. November 2025, Berne, Switzerland. Nov 19.

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 : 1

b) Seminars : 0

c) Hands-on training courses: 0

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
A	THE NETHERLANDS	1
D	CZECH REPUBLIC	1

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
ISO 17025	PDF	Akkreditierung-Urkunde-2020-2025.pdf
ISO 17025	PDF	Akkreditierung-Urkunde-2025-2030.jpg.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Histology, Immunohistochemistry, PCR-based molecular methods & sequencing	SAS (Schweizerische Akkreditierungsstelle)

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

Yes

Biorisk management is performed to according to federal ordinance (Verordnung) 814.912 Ordinance on Handling Organisms in Contained Systems („Verordnung über den Umgang mit Organismen in geschlossenen Systemen", Einschlussverordnung, EV). Adherence to these regulations is controlled and regularly assessed by the in-house biosafety officer (BSO) and is subject to checks on institutional, state (cantonal) and federal level.

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?

No

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

NETWORK/DISEASE	ROLE OF YOUR LABORATORY (PARTICIPANT, ORGANISER, ETC)	NO. PARTICIPANTS	PARTICIPATING WOAH REF. LABS
Ovine Chlamydiosis	Organizer and Participant	2	ANSES Paris; FLI Jena

25. Did you organise or participate in inter-laboratory proficiency tests with WOAH Reference Laboratories designated for the same pathogen during the past 2 years?

Yes

Purpose of the proficiency test:	Role of your Reference Laboratory (organiser/ participant)	No. participating Laboratories	Participating WOAH Ref. Labs/ organising WOAH Ref Lab
Proficiency of Real-time PCR for Chlamydiaceae; Proficiency of Real-Time PCR for Chlamydia abortus	Participant	20	ANSES Paris (organiser)

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
OIE Ring trial for improvement of molecular tests for Chlamydia abortus	Comparison of molecular tests for Chlamydia abortus	IVPZ Zurich, FLI Jena, ANSES Paris
Zoonotic infections due to avian Chlamydia abortus: what are we missing?	Publication, Opinion on the newly reclassified avian Chlamydia abortus	IVPZ Zurich, ANSES Paris

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 during the past 2 years?

No

We are organizing the next inter-laboratory proficiency test in spring 2026.

TOR12: EXPERT CONSULTANTS

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

No

29. Additional comments regarding your report:

No