

# OIE Reference Laboratory Reports Activities

## *Activities in 2020*

**This report has been submitted : 2021-02-15 10:01:34**

<b>Name of disease (or topic) for which you are a designated OIE Reference Laboratory:</b>	Brucellosis (Brucella abortus, B. melitensis, B. suis)
<b>Address of laboratory:</b>	Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise Via Campo Boario 64100 Teramo ITALY
<b>Tel.:</b>	+39 0861 33 2626
<b>Fax:</b>	+39 0861 332251
<b>E-mail address:</b>	f.demassis@izs.it
<b>Website:</b>	www.izs.it
<b>Name (including Title) of Head of Laboratory (Responsible Official):</b>	Nicola D'Alterio General Director Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise
<b>Name (including Title and Position) of OIE Reference Expert:</b>	Fabrizio De Massis DVM Head of Branch Laboratory
<b>Which of the following defines your laboratory? Check all that apply:</b>	Governmental Research

***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
RBT	Yes	293576	15
CFT	Yes	33991	15
ELISA (serum)	Yes	1039	0
I-ELISA (bovine serum)	Yes	1313	0
I-ELISA (porcine serum)	Yes	1345	0
C-ELISA (Bovine / Ovine / Caprine sera)	Yes	61	0
CFT RB51	Yes	2507	0
SAT B. canis	No	1791	0
Direct diagnostic tests		Nationally	Internationally
Bacterial isolation	Yes	2144	0
Brucella identification and biotyping (animal strains)	Yes	573	0
Brucella identification and biotyping (human strains)	Yes	1	0
PCR	Yes	1680	6
Real -Time PCR	Yes	1252	0
PCR-RFLP (identification)	Yes	574	6
Bruceladder	Yes	131	0
MLVA in silico from genome assembly	Yes	120	6
MLST	Yes	120	6
WGS (SNP typing, cgMLST)	Yes	1778	6

**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
Rose Bengal Antigen	RBT	Produced and provided (105080 ml)	172200	80 ml	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East
Brucella RB51 Antigen	CFT	Produced and provided	1362	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Brucella canis AGID Antigen	AGID	Produced (11 ml)	11 ml	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Brucella canis SAT Antigen	SAT	Produced and provided (22 ml)	600	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Rose Bengal Antigen <i>Brucella ceti</i>	RBT	Produced and provided (150 ml)	5	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
LPS Antigen from <i>Brucella abortus</i> 99	Various	Produced and provided (33.2 ml)	2.2	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East

LPS Antigen from <i>Brucella ceti</i>	Various	Produced and provided (17 ml)	1	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Negative Standard Bovine Serum for <i>Brucella abortus</i>	Negative control for all serological methods	Produced	1283	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Rabbit Serum positive for <i>Brucella canis</i>	Positive control for all serological methods	Provided	7.2	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Sheep Serum negative for <i>Brucella spp</i>	Negative control for all serological methods	Produced	23	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Bovine Serum Negative for <i>Brucella spp.</i>	Negative control for all serological methods	Produced and provided (1000 ml)	233	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
Water Buffalo Serum Positive for <i>Brucella abortus</i> strain RB51	Positive control for all serological methods	Produced and provided	1	0	0	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East

Pig Serum Positive for Brucella abortus strain RB51	Positive control for all serological methods	Produced and provided (200 ml)	0	2	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
National Standard Serum for Brucella abortus	Positive control for all serological methods	Produced	1189	0	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
Brucella spp. Strains (DNA)	PCR Standardization	Produced	0	1	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input checked="" type="checkbox"/> 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?

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?

No

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
ERFAN. Enhancing Research and Development in Africa through OIE Reference Laboratories and Collaborating Centres, and Poles of Excellence, as resultant of OIE twinning Projects - ERFAN (see question 25 for full list of participating countries)	3 years	ERFAN is an OIE network to facilitate and strengthen collaboration among countries of the SADC Region and Arab Maghreb Union (UMA) as well as IZSAM in the Animal health and food security domains	OIE CC University of Pretoria National Central Veterinary Laboratories, and some Faculties of Veterinary Science of other African countries: Angola, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe	ALGERIA ANGOLA LIBYA MOROCCO MOZAMBIQUE NAMIBIA TANZANIA TUNISIA ZAMBIA ZIMBABWE
OIE Twinning contract between the OIE reference network of Istituti Zooprofilattici Sperimentali (IIZZSS) in Italy (Parent Collaborating Centre) and the Abu Dhabi Food Control Authority (ADFCA), the Animal Health Centre for Diagnostic and research in Abu Dhabi - United Arab Emirates (Candidate Centre) for the establishment and development of an OIE Collaborating Centre on camel diseases.	3 years	OIE Twinning project	Abu Dhabi Food Control Authority - ADFCA Italian IIZZSS Network	UNITED ARAB EMIRATES
OIE project with the National Animal Health Diagnosis and Investigation Center (Ethiopia)	2 years	OIE project	Animal Health Diagnosis and Investigation Center (Ethiopia)	ETHIOPIA
Twinning project between the Central Veterinary Laboratory - Animal Health of Maputo and Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale" (IZSAM)	1 year	Twinning project funded by Italian Agency for Cooperation and Development (AICS)	Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale" Animal Health Central Veterinary Laboratory - Animal Health of Maputo	MOZAMBIQUE
Twinning Project Strengthening the Veterinary Services and Food Safety Capacities of the Lebanese Ministry of Agriculture - LB 15 ENI AG 03 18	2 years	Twinning project funded by the European Union	Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale" Lebanese Veterinary Services	LEBANON

IDEMBRU (see question 25 for full list of participating countries)	(30 months, 2020-2022)s	Identification of potentially emerging <i>Brucella</i> species: new threats for human and animals. To produce a toolkit of immunological and molecular techniques to detect classical and emerging strains of <i>Brucella</i> spp.	ANSES (lead) + Members of the consortium of One Health EJP	BULGARIA
IDEMBRU	(30 months, 2020-2022)s	Identification of potentially emerging <i>Brucella</i> species: new threats for human and animals. To produce a toolkit of immunological and molecular techniques to detect classical and emerging strains of <i>Brucella</i> spp.	ANSES (lead) + Members of the consortium of One Health EJP	BULGARIA FRANCE GERMANY ITALY PORTUGAL THE NETHERLANDS UNITED KINGDOM
OIE twinning project on Epidemiology and Risk Assessment Between IZSAM and the Department of Animal Resources Risk Assessment (KSA ARRAD) - Kingdom of Saudi Arabia.	3 years	OIE Twinning project	Department of Animal Resources Risk Assessment (KSA ARRAD) Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale"	SAUDI ARABIA

**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 Reference Laboratory collaborates with the OIE CC for veterinary epidemiology, in managing and updating the Information System on animal brucellosis, taking care, in particular, of the publication of the quarterly summaries on the progress of the national plans for the eradication of bovine, buffalo and sheep and goat brucellosis in non-officially free territories. Criteria for the calculation of main epidemiological indicators have been defined in order to highlight the dissemination or persistence of infection in specific geographic areas. The quarterly summaries are produced by integrating the laboratory data with the data generated by veterinary services activities.

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:
International and national research conference and seminars. See publications below

**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: 5

1. V. Paci, I. Krasteva, M. Orsini, T. Di Febo, M. Luciani, F. Perletta, A. Di Pasquale, M. Mattioli, M. Tittarelli: Proteomic analysis of *Brucella melitensis* and *Brucella ovis* for identification of virulence factor using bioinformatics approaches. 2020 Molecular and Cellular Probes doi:10.1016/j.mcp.2020.101581
2. Anna Janowicz; Fabrizio De Massis; Katuscia Zilli; Massimo Ancora; Manuela Tittarelli; Flavio Sacchini; Elisabetta Di Giannatale; Jason W. Sahl; Jeffrey T. Foster; Giuliano Garofolo: Evolutionary history and current distribution of West Mediterranean lineage of *Brucella melitensis* in Italy. 2020. Microbial Genomics. <https://doi.org/10.1099/mgen.0.000446>
3. Giuliano Garofolo, Antonio Petrella, Giuseppe Lucifora, Gabriella Di Francesco, Giovanni Di Guardo, Alessandra Pautasso, Barbara Iulini, Katia Varello, Federica Giorda, Maria Goria, Alessandro Dondo, Simona Zoppi, Cristina Esmeralda Di Francesco, Stefania Giglio, Furio Ferringo, Luigina Serrecchia, Mattia Anna Rita Ferrantino, Katuscia Zilli, Anna Janowicz, Manuela Tittarelli, Walter Mignone, Cristina Casalone, Carla Grattarola: Occurrence of *Brucella ceti* in striped dolphins from Italian Seas. PLOS ONE <https://doi.org/10.1371/journal.pone.0240178> October 2, 2020.
4. Di Francesco G., Di Renzo L., Garofolo G., Tittarelli M., Di Guardo G: Cetacean disease. Two neurotropic pathogens of concern for striped dolphins. 2020 Vet. Rec. <https://doi.org/10.1136/vr.m4294>
5. Khalafalla Al, Rashid J, Khan RA, Alamin KM, Benkhelil A, De Massis F, Calistri P, Giovannini A, Khan IA, Al Hosani MA, Al Muhairi SS. 2020. Preliminary Comparative Assessment of Brucellergene Skin Test for Diagnosis of Brucellosis in Dromedary Camels (*Camelus dromedarius*). Vector Borne Zoonotic Dis. 20: (6), 412-417. doi: 10.1089/vbz.2019.2537. <https://doi.org/10.1089/vbz.2019.2537>.

b) International conferences: 4

1. Fabrizio De Massis 13th Annual Workshop of EU National Reference Laboratories for Brucellosis (ANSES, Maisons Alfort, Paris, France), December 210th , 2020.
2. Nicola Maria Scarpa, Pratha Sah, Lara Savini, Luca Candeloro, Shweta Bansal and Vittoria Colizza. Local vs. movement-based spatial transmission of bovine brucellosis in Sicily. NETSCI 2020 Rome 17-25 September 2020.
3. Ponsart Claire, Al Dahouk S., Ashford R., Daskalov H., De Massis F., Freddi L., Garofolo G., Melzer F., Pelerito A., Umanets A., Whatmore A., Ferreira A.C. Identification of emerging *Brucella* species: new threats for human and animals (IDEMBRU). One Health EJP, Annual Scientific Meeting 2020, Prague, May 27th-29th, 2020.
4. Invited speech, Fabrizio De Massis, "Epidemiological Model for Bovine Brucellosis". 2nd International Symposium on Brucellosis Beijing, China dal 19 - 20 October 2020.

c) National conferences: 2

1. On the 5th of November 2020 IZSAM organized "A study day on Brucellosis" a national conference focused on reporting the current situation of Brucellosis in Italy, on ongoing and completed research activities with the aim of sharing knowledge for a continuous process of development and innovation. The topics included epidemiology, genomics, proteomics and vaccines related to brucellosis, covering from domestic animals to wildlife and marine mammals. The conference was also an occasion to present the results of national interlaboratory ring trials organized in 2018/2019.
2. Congress "I risultati della ricerca corrente condotta dall'Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise G. Caporale - Anno 2019", 26 June 2020, Teramo

d) Other:

- (Provide website address or link to appropriate information) 1  
[www.izs.it](http://www.izs.it)

**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: 3  
 c) Hands-on training courses: 0  
 d) Internships (>1 month): 2

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
d	Dr. Biniam Tadesse Derib Internship (DVM, MSc in Veterinary Microbiology, Researcher) from the Ministry of Agriculture National Animal Health Diagnostic and Investigation Center (NAHDIC), Sebeta Ethiopia. Teramo 3-21 February 2020	1
d	Internship of Dr. Mohammed Abed-Alhaleem A. Abu-Dalbouh (Jordan) as part of the CTR Biosciences Fellowship Program Funded by the DTRA Biological Threat Reduction Program January-May 2020	1
b	ERFAN - Web-training session for project partners. Online platform, 13/23/27 October 2020; 3/10/17 November 2020	45
b	The results of the Current Research conducted by IZSAM (Year 2019). Teramo, Italy, 26 June, 2020 (online event)	76
b	National training seminar on Brucellosis Teramo, Italy, 5 November 2020 (online event)	191

**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	2020-01-15 Certificato Accreditamento.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Complement Fixation test (CFT)	ACCREDIA (Member of EA, IAFand ILAC)
RBT	ACCREDIA (Member of EA, IAFand ILAC)
I-ELISA (milk and serum)	ACCREDIA (Member of EA, IAFand ILAC)
FPA	ACCREDIA (Member of EA, IAFand ILAC)
CFT - RB51	ACCREDIA (Member of EA, IAFand ILAC)
<i>Brucella</i> spp. Isolation	ACCREDIA (Member of EA, IAFand ILAC)
<i>Brucella</i> spp. Isolation from food matrix	ACCREDIA (Member of EA, IAFand ILAC)
Identification and typing	ACCREDIA (Member of EA, IAFand ILAC)
c-ELISA	ACCREDIA (Member of EA, IAFand ILAC)
PCR-RFLP	ACCREDIA (Member of EA, IAFand ILAC)
PCR Bruce ladder	ACCREDIA (Member of EA, IAFand ILAC)

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: <sup>1</sup>	Role of your Reference Laboratory (organiser/ participant)	No. participants	Participating OIE Ref. Labs/ organising OIE Ref. Lab.
EU Bovine Brucellosis Serum Proficiency Test 2020 organised by EU-RL ANSES	Participant	27 EU countries	ANSES France EU RL for Brucellosis

<sup>1</sup> 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
ANIHWA (EpiRisk)	Integrated epidemiological models for risk-based surveillance approaches.	IZSAM Scientific coordinator (OIE RL and NRL for Brucellosis)- Italy, Spain (IRTA; Barcellona), The Netherlands (CVI, part of Wageningen UR now called WBVR (Wageningen BioVeterinary Research), Israel (Kimron Veterinary Institute, OIE Reference Laboratory for Brucellosis)
ARIMNET (BrucMedNet)	Improvement of epidemiological and serological tools for diagnosis and control of Brucellosis in the Mediterranean region.	IZSAM Scientific coordinator (OIE RL and NRL for Brucellosis)-Italy, Portugal, Greece, Tunisia, Egypt, Spallanzani Institute, Milan- Italy and IZS Sicily-Italy
IDEMBRU	Capacity building for atypical Brucella	OIE RReference Laboratories for Brucellosis: ANSES Scientific coordinator, FLI Germany , APHA UK
EURL Workprogramme 2019-2020	Diagnostic tools and genotyping	ANSES (FR), APHA (UK), FLI (DE)

**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?

Yes

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

Purpose for inter-laboratory test comparisons <sup>1</sup>	No. participating laboratories	Region(s) of participating OIE Member Countries
7th IZSAM National and international proficiency testing for brucellosis identification in food	11 national laboratories	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
14th IZSAM National and international proficiency testing for brucellosis identification in animal specimens	16 national laboratories	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
20th IZSAM National and international brucellosis serology proficiency testing	66 national laboratories	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East

**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: