

# OIE Reference Laboratory Reports Activities

## *Activities in 2019*

**This report has been submitted : 2020-01-15 15:11:07**

<b>Name of disease (or topic) for which you are a designated OIE Reference Laboratory:</b>	West Nile Fever
<b>Address of laboratory:</b>	Via Campo Boario 64100 Teramo ITALY
<b>Tel.:</b>	+39 0861 33.22.05
<b>Fax:</b>	+39 0861 33.22.51
<b>E-mail address:</b>	f.monaco@izs.it
<b>Website:</b>	www.izs.it
<b>Name (including Title) of Head of Laboratory (Responsible Official):</b>	Nicola D'Alterio Deputy Director, Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise, "G. Caporale"
<b>Name (including Title and Position) of OIE Reference Expert:</b>	Federica Monaco Head of the diagnosis and surveillance of exotic diseases of animals laboratory Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale"
<b>Which of the following defines your laboratory? Check all that apply:</b>	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
c-ELISA - IgG	Yes	1353	5
ELISA - IgM	Yes	1409	5
Virus Neutralization (microtitre)	Yes	1380	5
Direct diagnostic tests		Nationally	Internationally
Virus isolation (C6/36 and Vero cells)	Yes	226	
Real-time RT-PCR WNV lineage 1 and Lineage 2	Yes	6652	100
Real time RT-PCR Flavivirus group	No	402	
Whole genome sequencing	No	74	

**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
Purified MoAb vs WNV	Immunofluorescence, ELISA	Produced	54.5 ml	-	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
Vero/P cells	Virus isolation on tissue culture	Produced and provided	-	1 flask (75 cm2)	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East
Vero/BS cells	Virus isolation on tissue culture	Produced and provided	-	1 flask (75 cm2)	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americ as <input type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input checked="" type="checkbox"/> Middle East
Usutu virus (2 field strains)	Real-time RT-PCR	Produced and provided	-	2 ml	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
Usutu virus, strain SAAR_1776	Real-time RT-PCR	Produced and provided	4 ml	1 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

WNV strain B956 (inactivated)	Real-time RT-PCR	Produced and provided	2 ml	1 ml	2	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
WNV strain Eg101 (inactivated)	Real-time RT-PCR	Produced and provided	2 ml	1 ml	2	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input 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?

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
SERBIA	October	100 mosquitoes pools	-
CROATIA	December	5 sera	5 sera

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
ITALY	In the framework of the national surveillance plan for WNV and Usutu virus for 2019, the laboratory has been in charge for: - defining the surveillance activities in animals and vectors; - harmonizing and assessing the diagnostic capabilities of the regional laboratories network through proficiency tests; - the collection and management of the data generated by the surveillance activities in animals and vectors	In loco and remote assistance
SERBIA	Strengthen diagnostic capabilities focused on entomological surveillance	Training on the job
FRANCE	Investigate the pathogenicity of flaviviruses circulating in the Mediterranean area	Remote assistance
CROATIA	Support to the diagnostic capabilities	Remote assistance
BELGIUM	Develop an avian model for flavivirus infection	Remote assistance

***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
Risk of introduction and spread of vector-borne viruses in Italy	3 years	Assessment and comparison of vector competency of the Italian populations of <i>Culex pipiens</i> in WNV lineages 1 and 2 transmission	Etlik Veterinary Control Central Research Institute, Turkey	TURKEY
Epidemiological models for control of arboviral diseases for Europe (ARBONET)	3 years	Epidemiological modelling of possible scenarios of WNV spread in EU evaluating possible risk-based surveillance approaches and outbreak control. Promote and support epidemiological studies on distribution of viral genetic subpopulation. To increase the actual knowledge of virus-vector and virus-vertebrate host interactions.	Karolinska Institute, Sweden; Friedrich-Loeffler-Instituts, Germany; Pirbright Institute, UK; ANSES, France; Kimron Institute, Israel; Institute Pasteur, France; Animal and Plant Health Agency, UK	FRANCE GERMANY ISRAEL SWEDEN UNITED KINGDOM
Artificial Intelligence and Earth Observation data: innovative methods for monitoring West Nile Disease spread in Italy (ESA/AO/1-9101/17/I-NB)	12 months	Develop an innovative, scalable and accurate process to produce West Nile Disease (WND) risk maps, using Earth Observation data (Sentinel-2, Sentinel-3, PROBA-V, etc.) and specific Artificial Intelligence algorithms (learning architecture based on Convolutional Neural Network and Graph Theory.	AlmageLab, University of Modena and Reggio Emilia, Italy; Progressive Systems, Frascati, Italy ReMedia Italy, Rome, Italy European Space Agency EO Science for Society programme, Frascati, Italy	ITALY

Med-Vet ET-1 JRP "Metagenomic Array Detection of emerging Virus in EU" (MAD-VIR)	2 years	Microarray assay to identify simultaneously vector borne pathogens including WNV	Satens Serum Institute, Denmark Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail (ANSES), France, National Veterinary Research Institute (NVRI-PIWet), Poland, Animal and Plant Health Agency (APHA), UK National Center for Epidemiology (OIK), Hungary, Veterinary Research Institute (VRI), Czech Republic, Surrey Univ. (UoS), UK	CZECH REPUBLIC DENMARK FRANCE HUNGARY ITALY POLAND SPAIN UNITED KINGDOM
---	---------	---	---	--

**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:
<p>Data about human outbreaks in EU Member States and EU neighbouring countries are collected from the European Surveillance System (TESSy) database while animal data are collected through the Animal Disease Notification System (ADNS) of the European Commission and the World Animal Health Information System (WAHIS) database (<a href="https://www.oie.int/wahis_2/public/wahid.php/Diseaseinformation/Diseasehome">https://www.oie.int/wahis_2/public/wahid.php/Diseaseinformation/Diseasehome</a>). Furthermore, outbreak data referred to animal cases are retrieved from National Public Health Organizations of the affected countries: • Junta de Andalucia (<a href="https://www.juntadeandalucia.es/index.html">https://www.juntadeandalucia.es/index.html</a>) (Spain) • Hellenic Centre of disease a prevention Keelpno (<a href="https://eody.gov.gr/en/epidemiological-statistical-data/weekly-epidemiological-reports/">https://eody.gov.gr/en/epidemiological-statistical-data/weekly-epidemiological-reports/</a>) (Greece) • Agence régionale de santé Provence-Alpes-Côte d'Azur (ARS Paca) (<a href="https://www.paca.ars.sante.fr/recherche-globale?search_ars=west+nile">https://www.paca.ars.sante.fr/recherche-globale?search_ars=west+nile</a>) (France) • Sistema Informativo Nazionale Malattie Animalì (SIMAN) (<a href="https://www.vetinfo.it/">https://www.vetinfo.it/</a>) (Italy)</p>

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:

A Web Geographic Information System application has been developed to collect and disseminate disease data, climatic and environmental remote sensed data, full genome sequences of selected isolated strains of WNV. The tool (Disease Monitoring Dashboard) compiles multiple datasets through user-friendly web tools for epidemiological analysis (<https://netmed.izs.it/networkMediterraneo/>) In the framework of FP7 project "International Network for Capacity Building for the Control of Emerging Viral Vector Borne Zoonotic Diseases (Arbozoonet), a WEB-GIS model has been designed and regularly updated to collect and map WNV data coming from official notifications and from literature. (<http://arbozoonet.izs.it/arbozoonet/>) WNV data are disseminated through a public web site ([www.izs.it](http://www.izs.it)) where information and data on West Nile is continuously updated in order to have: □ weekly bulletins during the epidemic season summarizing the current (2019) epidemiological situations in Italy and the Mediterranean Basin; □ maps on entomological, virological and serological surveillance activities; □ the past epidemiological situations in Italy (2008-2018) and the Mediterranean Basin(2010-2018); □ the latest on the Italian and European Regulations issued by the Italian Ministry of Health; □ scientific documents on-line.

**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: 8

1. Calistri P., Conte A., Monaco F., Goffredo M., Danzetta M.L., Di Sabatino D., Iapaolo F., Candeloro L., Ippoliti C., Mancini G., Giovannini A. 2019. Possible drivers for the increased West Nile virus transmission in Italy in 2018. *International Journal of Infectious Diseases* 79, 27-28.
2. Lorusso A., Marini V., Di Gennaro A., Carmine I., Ronchi G.F., D'Alterio N., Casaccia C., Savini G., Monaco F., Horton DL. 2019. Antigenic relationship among zoonotic flaviviruses from Italy. *Infect Genet Evol.* Dec 2. pii: S1567-1348(18)30609-9. doi: 10.1016/j.meegid.2018.11.023.
3. Rizzo F., E. Borgni, C. Ghia, M. Belvedere, A. Dondo, F. Monaco, M. Giammarino, R. Orusa. L. Chiavacci, M.L. Mandola. 2019. West Nile and Usutu circulation in wild birds from North-West Italy 2015-2018. *International Journal of Infectious Diseases*. Volume 79, Supplement 1, February 2019, Page 147. <https://doi.org/10.1016/j.ijid.2018.11.358>
4. Monaco F, Purpari G, Di Gennaro A, Mira F, Di Marco P, Guercio A, Savini G. 2019. Immunological response in horses following West Nile virus vaccination with inactivated or recombinant vaccine. *Vet Ital.* 2019 Mar 31;55(1):73-79. doi: 10.12834/VetIt.1820.9611.1
5. Vilibic-Cavlek T, Savic V, Sabadi D, Peric L, Barbic L, Klobucar A, Miklausic B, Tabain I, Santini M, Vucelja M, Dvorski E, Butigan T, Kolaric-Sviben G, Potocnik-Hunjadi T, Balenovic M, Bogdanic M, Andric Z, Stevanovic V, Capak K, Balicevic M, Listes E, Savini G. Prevalence and molecular epidemiology of West Nile and Usutu virus infections in Croatia in the 'One health' context, 2018. *Transbound Emerg Dis.* 2019 Sep;66(5):1946-1957. doi: 10.1111/tbed.13225. Epub 2019 May 26. PMID: 31067011
6. Vilibic-Cavlek T., Savic V., Petrovic T., Toplak I., Barbic L., Petric D., Irena Tabain, Hrnjakovic-Cvjetkovic I., Bogdanic M., Klobucar A., Mrzljak A., Stevanovic V., Dinjar-Kujundzic P., Radmanic L., Monaco F., Listes E., Savini G. Emerging trends in the epidemiology of West Nile and Usutu virus infections in Southern Europe. *Frontiers in Veterinary Science*, section Veterinary Infectious Diseases. DOI: 10.3389/fvets.2019.00437
7. Pascucci I., Di Domenico M., Capobianco Dondona G., Di Gennaro A., Polci A., Capobianco Dondona A., Mancuso E., Cammà C., Savini G., Cecere J.G., Spina F., Monaco F. 2019. Assessing the role of migratory birds in the introduction of ticks and vector borne pathogens from African countries: an Italian experience. *Ticks and Tick-Borne Diseases*. <https://doi.org/10.1016/j.ttbdis.2019.101272>
8. Amdouni J., Monaco F., Portanti F., Sghaier S., Conte A., Ben Hassine T., Savini G., Hammami S. 2020. Detection of enzootic circulation of West Nile virus using domestic birds and first West Nile sequencing in chicken in the north of Tunisia. *Acta Tropica*. Send to production 14 Oct 2019 doi.org/10.1016/j.actatropica.2019.105223

b) International conferences: 5

1. Cosseddu GM., Monaco F. Investigation of mutations in the WNV genome induced by single host adaptation and their effect on virulence. In *Epidemiological models for control of arboviral diseases for Europe*, final meeting. Teramo, Italy, 2 May 2019. Oral presentation.
2. Lorusso A. Genome manipulation of West Nile and Usutu viruses. *Epizone 2019*, Berlin, Germany, August 26-28, 2019. Oral presentation.
3. Lorusso A. The envelope protein of Usutu virus attenuates WNV virulence in mice. 100th Conference of Research Workers in Animal Diseases, Chicago-Illinois (USA), November 2-5, 2019. Oral presentation.
4. Monaco F. "Surveillance of West Nile disease in Italy: example of an integrated One Health approach". *Animal health risk assessment and vector-borne diseases*, Bucharest, Romania, 3 April 2019.



5. Calistri P. "Epidemiological surveillance and risk factors". Animal health risk assessment and vector-borne diseases. Bucharest, Romania, 3 April 2019.

c) National conferences: 3

-Workshop "Mosquitoes: a public health threat", Pescara, Italy, 15 November 2019.

o Monaco F. "West Nile Disease in Italy: the One-Health surveillance". Oral presentation.

-Workshop "The results of the research activities in IZSAM". Teramo, 13 June 2019

o Cosseddu G.M. "WNV adaptation on vector cell lines modifies the virus pathogenicity in the murine model". Oral presentation.

-Workshop "Zoonosis and vector-borne emerging diseases" Avezzano, 5 December 2019.

o Di Sabatino D. "One-Health: an integrated approach". Oral presentation.

o Iapaolo F. "The WNV integrated surveillance" Oral presentation.

o Goffredo M. "Entomological surveillance". Oral presentation.

d) Other:

(Provide website address or link to appropriate information) 3

Please refer to the answer provided for the question n.12 for the details related to the links listed below:

Epidemiological situation in Italy and the Mediterranean region: [www.izs.it](http://www.izs.it)

Disease Monitoring Dashboard: <https://netmed.izs.it/networkMediterraneo/>

International Network for Capacity Building for the Control of Emerging Viral Vector Borne Zoonotic Diseases

(Arbozoonet): <http://arbozoonet.izs.it/arbozoonet/>

**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: 0

c) Hands-on training courses: 2

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
c	Serbia	2
d	Croatia	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)
UNI CEI EN ISO/IEC 17025:2005	Certificate of accreditation_ISO_17025_IZSAM.pdf
UNI CEI EN ISO/IEC 17025:2005	Accredia extension.pdf

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
i-ELISA - IgG	ACCREDIA
c-ELISA- - IgG	ACCREDIA
ELISA IgM	ACCREDIA
Plaque Reduction neutralization test (PRNT)	ACCREDIA
Virus neutralization (microtitre format)	ACCREDIA
Real-time RT-PCR WNV lineage 1	ACCREDIA
Real-time RT-PCR WNV lineage 1 and lineage 2	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?

Yes

National/ International	Title of event	Co-organiser	Date (mm/yy)	Location	No. Participants
International	ERFAN-Enhancing Research for Africa Network First Working groups meeting in SADC Region	Central Veterinary Laboratory, Windhoek Faculty of Veterinary Science, UNAM	9/19	Hotel Hilton, Windhoek, Namibia	60
International	Enhancing Research for Africa Network, Second North-West Africa Workshop	OIE Sub-Regional Office- Tunis, Tunisia	11/19	Hotel Golden Tulip, Tunis, Tunisia	53

19. Did your laboratory participate in scientific meetings on behalf of the OIE?

Yes

Title of event	Date (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
Enhancing Research for Africa Network, Second North-West Africa Workshop	11/19	Hotel Hilton, Windhoek, Namibia	speaker	Draft activities for the working group on Vector borne diseases with emphasis on West Nile virus
Animal health risk assessment and vector-borne diseases	4/19	Institute for Diagnosis and Animal Health, Bucharest, Romania	speaker	"Surveillance of West Nile disease in Italy: example of an integrated One Health approach" and "Epidemiological surveillance and risk factors"

***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?

No

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?

No

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?

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
Determining a laboratory's capability to conduct specific diagnostic tests. Serological assays: ELISA IgG, ELISA IgM. Organizer.	16	<input checked="" type="checkbox"/> Africa <input type="checkbox"/> Americas <input type="checkbox"/> Asia and Pacific <input checked="" type="checkbox"/> Europe <input type="checkbox"/> Middle East
Determining a laboratory's capability to conduct specific diagnostic tests. Molecular assays: RT-PCR for WNV detection and/or Lineage identification. Organizer.	18	<input checked="" 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: