WOAH Reference Laboratory Reports Activities 2022

Activities in 2022

This report has been submitted : 14 février 2023 17:32

Laboratory Information

Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:	West Nile fever
Address of laboratory:	Via Campo Boario 64100 Teramo ITALY
Tel.:	+39 0861 2231
E-mail address:	f.monaco@izs.it
Website:	www.izs.it
Name (including Title) of Head of Laboratory (Responsible Official):	Nicola D'Alterio, General Director, Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise, "G. Caporale"
Name (including Title and Position) of WOAH Reference Expert:	Federica Monaco, Head of the diagnosis and surveillance of exotic viral diseases of animals laboratory Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale"
Which of the following defines your laboratory? Check all that apply:	Governmental

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
c-ELISA - IgG	Yes	207	546
ELISA - IgM	Yes	165	6
Virus Neutralization (microtitre)	Yes	197	71
Direct diagnostic tests		Nationally	Internationally
Virus isolation (C6/36 and Vero cells)	Yes	443	-

Real-time RT-PCR WNV lineage 1 and Lineage 2	Yes	3107	-
Real-time RT-PCR WNV all lineages	No	3107	-
Whole genome sequencing	No	99	-

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
Purified MoAb vs WNV	Immunofluorescence, ELISA	Produced	48 ml	-	-	
Vero/P cells	Virus isolation on tissue culture	Produced and provided	30 ml	-	-	
Vero/C6/36 cells	Virus isolation on tissue culture	Produced and provided	30 ml	-	-	
WNV lineage 1 reference strain Eg101	RT-PCR	Produced and provided	21 ml	-	-	
WNV lineage 2 reference strain B956	RT-PCR	Produced and provided	21 ml	-	-	
WNV field strain	RT-PCR	Produced and provided	30 ml	-	-	

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAH Members?

No

TOR3: NEW PROCEDURES

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

No

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?

No

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

No

TOR4: DIAGNOSTIC TESTING FACILITIES

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

Yes

NAME OF WOAH MEMBER COUNTRY SEEKING ASSISTANCE	DATE	WHICH DIAGNOSTIC TEST USED	NO. SAMPLES RECEIVED FOR PROVISION OF DIAGNOSTIC SUPPORT	NO. SAMPLES RECEIVED FOR PROVISION OF CONFIRMATORY DIAGNOSES
NAMIBIA	2022-10-01	c-ELISA IgG and VNT	546	-
BULGARIA	2022-12-01	ELISA IgM	-	6

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	Possible approches to WNV surveillance and control based on the Italian experience	Preliminary questionnaire and on line discussion
GERMANY	WNV as prototype of One-Health surveillance (in the framework of the project «Promoting One Health in Europe through joint actions on foodborne zoonoses, antimicrobial resistance and emerging microbiological hazards - OneHealth EJP – MATRIX»	On line discussion
ITALY	In the framework of the national surveillance plan for WNV and Usutu virus for 2022, 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

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
Senegal – Italy Arbovirus Introduction and Emergence (SIAIE)	3 years	Characterization of WNV and USUV, geographically and within specific host and vector populations, between Senegal and Italy	- Institute Pasteur, Senegal -Fondazione Edmund Mach, Italy	SENEGAL
European network of medical and veterinary entomology (VectorNet)	5 years	Developing a network of medical and veterinary experts and organisations to maintain a common database on the presence and distribution of vectors and pathogens in vectors across Europe and the Mediterranean basin	ECDC EFSA Experts and organisations from the medical and veterinary domains	

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:
• Italian data are collected from the Sistema Informativo Nazionale Malattie Animali (SIMAN) https://www.vetinfo.it/(Italy) • Data about human outbreaks in EU Member States and EU neighbouring countries are collected from the European Surveillance System (TESSy) database while worldwide animal data are collected through the Animal Disease Information System (ADIS) of the European Commission and the World Animal Health Information System (WAHIS) database. https://wahis.woah.org/#/home Furthermore, outbreak data referred to human cases in Greece are retrieved from the National Public Health Organization (NPHO) Report_WNV_20220906_ENG.pdf (eody.gov.gr):

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:
A Web Geographic Information System application has been developed to collect and disseminate disease data, and 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/) WNV data are disseminated through a public web site (www.izs.it) where information and data on WN is continuously updated in order to have: • weekly bulletins summarizing the current (2022) epidemiological situations in Italy and Mediterranean Basin; • maps on entomological, virological and serological surveillance activities; • the past epidemiological situations in Italy (2008-2021) and the Mediterranean Basin (2010-2021); • the latest on the Italian and European Regulations; • scientific documents on-line.

Since 2018 surveillance activities are summarized in the interactive StoryMaps available on the public web site (https://westnile.izs.it/j6_wnd/home) and provide a description of the disease and the complete data from the human, animal and entomological surveillance activities.
A predictive model to identify area at risk for WNV circulation has been developed and is freely accessible (https://mapserver.izs.it/gis_wn_predictions/#). The model uses EO data with the WNV detection in mosquitoes, birds and horses since 2017 to train an Extreme Gradient Boosting model to automatically predict in space and time WNV circulation

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:

10

1. Amdouni J., Conte A., Ippoliti C., Candeloro L., Tora S., Sghaier S., Hassine T. B., Fakhfekh E. A., Savini G., Hammami S. Culex pipiens distribution in Tunisia: Identification of suitable areas through Random Forest and MaxEnt approaches Veterinary Medicine and Science. 2022. 10.1002/vms3.897.
2. Giglia G., Mencattelli G., Lepri E., Agliani G., Gobbi M., Grone A., van den Brand Judith M. A., Savini G., Mandara M T. West Nile Virus and Usutu Virus: A Post-Mortem Monitoring Study in Wild Birds from Rescue Centers, Central Italy. Viruses-Basel. 2022. 14 9 1994 1994. 10.3390/v14091994.
3. Mancuso E, Cecere J G., Iapaolo F., Di Gennaro A., Sacchi M., Savini G., Spina F., Monaco F. West Nile and Usutu Virus Introduction via Migratory Birds: A Retrospective Analysis in Italy. Viruses-Basel. 2022. 14 2 416 416. 10.3390/v14020416.
4. Mancuso E., Toma L., Pascucci I., D'Alessio S. G., Marini V., Quaglia M., Riello S., Ferri A., Spina F., Serra L., Goffredo M., Monaco F. Direct and Indirect Role of Migratory Birds in Spreading CCHFV and WNV: A Multidisciplinary Study on Three Stop-Over Islands in Italy. Pathogens. 2022. 11 9 1056 1056. 10.3390/pathogens11091056.
5. Mencattelli G., Ndione M. H. Dior, Rosa R., Marini G., Diagne C. T., Diagne M. M., Fall G., Faye O., Diallo M., Faye O., Savini G., Rizzoli A. West Nile Virus in Africa: Current Epidemiological Situation and Knowledge Gaps. International Journal of Infectious Diseases. 2022. 116 S123 S123. 10.1016/j.ijid.2021.12.291.
6. Mencattelli, G., Iapaolo, F., Polci, A., Marcacci, M., Di Gennaro, A., Teodori, L., Curini, V., Di Lollo, V., Secondini, B., Scialabba, S., Gobbi, M., Manuali, E., Cammà, C., Rosà, R., Rizzoli, A., Monaco, F., Savini, G. (2022). West Nile Virus Lineage 2 Overwintering in Italy. Tropical medicine and infectious disease, 7(8), 160.
7. Mencattelli, G., Ndione, M. H. D., Rosà, R., Marini, G., Diagne, C. T., Diagne, M. M., Fall, G., Faye, O., Diallo, M., Faye, O., Savini, G., & Rizzoli, A. (2022). Epidemiology of West Nile virus in Africa: An underestimated threat. PLoS neglected tropical diseases, 16(1), e0010075. https://doi.org/10.1371/journal.pntd.0010075
8. Molini U., Franzo G., Rautenbach I., Otto H. V., Khaiseb S., Di Gennaro A., Ntahonshikira C., Baines I., Monaco F., Savini G., D'Alterio N. Neutralising antibodies to West Nile virus detected in horses in Windhoek, Namibia. Journal of the South African Veterinary Association. 2022. 93 1. 10.36303/JSAVA.2022.93.1.165.
9. Riccardo F., Bella A., Monaco F., Ferraro F., Petrone D., Mateo-Urdiales A., Andrianou X. D., Del Manso M., Venturi G., Fortuna C., Di Luca M., Severini F., Caporali M. G., Morelli D., Iapaolo F., Pati I., Lombardini L., Bakonyi T., Alexandra O., Pezzotti P., Perrotta M. G., Maraglino F., Rezza G., Palamara A. T., Palmieri D., Di Giacomo M., La Bianca M., Mignuoli A. D., De Gaetano A., D'Argenzio A., Gualanduzzi C., Giulio M., Mattei G., Castelli M., Vairo F., Sticchi C., Moschi R., Cereda D., Diurno G., Crottogini L., Fiacchini D., Filippetti F., Colitti M., Mariano M., Spertini S., Zuccali M. G., Pasqualini C., Lombardi D., Prato R., Palmas M. A., Palermo M., Balocchini E., AngiÃ F., Senatore D., Foresi S., Ruffier M., Zanella F., Ballarin D., Russo F., Rota M. C., Alacreu A. O., Mellace F., Giannitelli S., Donadio R., Pupella S., Toma L., Savini G., Goffredo M., Quaglia M., Conte A., Calistri P., Di Sabatino D., Di Donato G., Scicluna M. T., Manna G., Lelli D., Calzolari M.,De Filippo F., Iannone R., Viscardi M., Masoero L., Casalone C., Cavaliere N., Padalino I., Puggioni G., Purpari G., Costarelli S., Giammarioli M., Gavaudan S., Terregino C., Montarsi F., Capelli G., Barzon L. Italian Arbovirus Surveillance network Rapid increase in neuroinvasive West Nile virus infections in humans, Italy, July 2022. Eurosurveillance. 2022. 27 36. 10.2807/1560-7917.ES.2022.27.36.2200653.
10. Santini M., Haberle S., Židovec-Lepej S., Savić V., Kusulja M., Papić N., Višković K., Župetić I., Savini G., Barbić L., Tabain I., Kutleša M., Krajinović V., Potočnik-Hunjadi, T., Dvorski E., Butigan T., Kolaric-Sviben G., Stevanović V., Gorenec L., Grgić I., Vilibić-Čavlek T. (2022). Severe West Nile Virus Neuroinvasive Disease: Clinical Characteristics, Short- and Long-Term Outcomes. Pathogens (Basel, Switzerland),

11(1), 52.

b) International conferences:

3
1. Ippoliti C., Vincenzi S., Bonicelli L., D'Alessio S.G., Di Lorenzo A., Tora S., Porrello A., Calderara S., De Ascentis M., Quaglia M., Goffredo M., Conte A. Sentinel 2 and Deep Learning methods to map Culex pipiens distribution in central Italy, ESA LIVING PLANET SYMPOSIUM, Bonn, 23-27 Maggio 2022.
2. Ippoliti C., Vincenzi S., Bonicelli L., D'Alessio S.G., Di Lorenzo A., Tora S., Porrello A., Calderara S., De Ascentis M., Quaglia M., Goffredo M., Conte A. Sentinel 2 and Deep Learning methods to map Culex pipiens distribution in central Italy, MOOD - Identify Signs And Drivers Of Zoonotic Diseases Emergence And Digital Data Resources For Epidemic Intelligence, Trento, 28-29 Settembre 2022 https://mood-h2020.eu/event/identify-signs-and-drivers-of-zoonotic-diseases-emergence-and-digital-data-resources-for-epidemic-intelligence/.
3. Ippoliti C., Vincenzi S., Bonicelli L., D'Alessio S.G., Di Lorenzo A., Tora S., Porrello A., Calderara S., De Ascentis M., Quaglia M., Goffredo M., Conte A. Sentinel 2 and Deep Learning methods to map Culex pipiens distribution in central Italy, Webinar 15.11.2022 in THEIA Atelier Télédétection Et Risques & Maladies Infectieuses, CIRAD

c) National conferences:

3
Pati,S. Pupella, A. Bella F. Iapaolo, M. La Raja, F. Riccardo,D. Morelli, F. Masiello, V. De Angelis Integrated surveillance and response to West Nile virus in the Italian blood transfusion network ISBT 2022 Virtual Congress
2. Monaco F., Iapaolo F. "Epidemiologia veterinaria dell'infezione da WNV e Usutu". Convegno West Nile virus Sorveglianza integrata e sieroprevalenza nei donatori di sangue ed emocomponenti e nei donatori di organi, cellule e tessuti in Italia. Roma, 6 December 2022. Oral presentation.
3. Monaco F., Iapaolo F. "Situazione attuale WNV/USUV in Europa e in Italia". Webinar Le malattie da vettori nell'interfaccia uomo/animale: focus su WNV/USUV ma non solo. 7 December 2022. Oral presentation.

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

4
Please refer to the answer provided for the question n.15 for the details related to the links listed below:
Epidemiological situation in Italy and the Mediterranean region: www.izs.it
Disease Monitoring Dashboard: https://netmed.izs.it/networkMediterraneo/
StoryMaps 2017-2021 (https://westnile.izs.it/j6_wnd/home)
WNV predictive model (https://mapserver.izs.it/gis_wn_predictions/#)

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 : -

c) Hands-on training courses: 3

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

a	Algeria	1
c	Albania	1
c	Serbia	2
d	Croatia	1
d	Italy	1

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
17025		Accreditation certificate.pdf

19. 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

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

Yes

The biosecurity policy integrates aspects related to safety, security and environment, in fact risks associated with all our activities are assessed and managed to ensure the safety of workers and of the environment in accordance with international standards. In particular, IZS- Teramo has developed its biosecurity manual in accordance with the WHO standards “The WHO Laboratory Biosafety Manual (LBM) 4th ed.) as well as the specific procedures for safe handling and containment of infectious microorganisms and hazardous biological material. Furthermore, to reduce or eliminate the exposure of the environment (air, water, soil) to potentially infectious or hazardous agents IZSAM obtained the certification according to the ISO 14001 Lastly, a rigorous management of biologicals, chemicals and their associated waste is in place and information and communication to personnel done on a routine bases. To ensure the safety handling and movement of goods, the IZS-Teramo has developed protocols and procedures according to the World Health Organization standards (WHO/WHE/CPI/2019.20 Guidance on regulations for the Transport of infectious Substances”- 2019-2020; pag.1-29.). The laboratory is officially authorised by the Italian Ministry of Health to import biological materials and biological reagents of any origin through the airports of Rome (Fiumicino) and Milan (Malpensa and Linate) Transport by air of biological materials considered as infectious substances is done according to the international regulations guidelines developed by IATA (Infectious Substances Shipping Guidelines-1 January 2006- 7th Edition p.1-41). The IZS - Teramo also complies with ADR (European Agreement concerning the International Carriage of Dangerous Goods by Road and Directive 2014/103/UE) regulations to guarantee the safe road transportation of

dangerous goods and owns vehicles properly equipped for the purpose. Traceability of biological material for research purposes is provided by the use of MTA, and dispatch and receipt are regulated by Standard Operating procedures.

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?

Yes

Title of event	Date (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
THEIA Atelier Télédétection Et Risques & Maladies Infectieuses	2022-11-01	Virtual meeting	Speaker	Sentinel 2 and Deep Learning methods to map Culex pipiens distribution in central Italy
West Nile virus Sorveglianza integrata e sieroprevalenza nei donatori di sangue ed emocomponenti e nei donatori di organi, cellule e tessuti in Italia	2022-12-06	Rome, Italy	Speaker	Epidemiologia veterinaria dell'infezione da WNV e Usutu
Le malattie da vettori nell'interfaccia uomo/animale: focus su WNV/USUV ma non solo	2022-12-07	Virtual meeting	Speaker	Situazione attuale WNV/USUV in Europa e in Italia
ESA Living Planet Symposium	2022-05-05	Bonn, Germany	Poster	Sentinel 2 and Deep Learning methods to map Culex pipiens distribution in central Italy
37th International Congress of the International Society of Blood Transfu	2022-06-10	Virtual meeting	Poster	Integrated surveillance and response to West Nile virus in the Italian blood transfusion network
MOOD - Identify Signs And Drivers Of Zoonotic Diseases Emergence And Digital Data Resources For Epidemic Intelligence	2022-09-22	Trento, Italy	Poster	Sentinel 2 and Deep Learning methods to map Culex pipiens distribution in central Italy

TOR10: NETWORK WITH WOAH REFERENCE LABORATORIES

23. Did your laboratory exchange information with other WOAH Reference Laboratories designated for the same pathogen or disease?

No

24. Are you a member of a network of WOAH Reference Laboratories designated for the same pathogen?

No

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

No

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?

No

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?

Yes

Purpose for inter-laboratory test comparisons1	Role of your reference laboratory (organizer/participant)	No. participating laboratories	Region(s) of participating WOAH Member Countries
Determining a laboratory's capability to conduct specific diagnostic tests. Molecular assays: RT-PCR for viral detection and/or Lineage identification)	Organizer	13	Europe
Determining a laboratory's capability to conduct specific diagnostic tests. Serological assays: ELISA IgG, ELISA IgM	Organizer	11	Europe

TOR12: EXPERT CONSULTANTS

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

No

29. Additional comments regarding your report:

No