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# WNV Surveillance system in EU (vector, human, animal)

Webinar on Vector – borne Zoonoses affecting equines
Japanese Encephalitis (JE) and West Nile fever (WNF)

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*WOAH Reference laboratory for WNF*

Wednesday 29th March 2023

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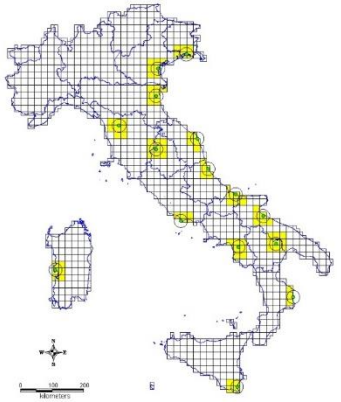
# WNV and Usuv surveillance: the Italian model

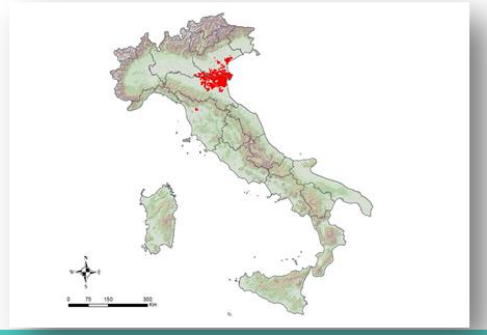
# WNV and Usuv surveillance: the Italian model

**1998 -** First outbreak in Tuscany (Padule di Fucecchio)
14 **horses** with neurological symptoms
No human cases

**2001 -** a **multi-species** surveillance plan including **wild, resident birds, poultry, horses** and **mosquitoes** is in place to **early detect** WNV introduction/circulation and to monitor the spread of the infection.



**2008 -** WNV was identified in mosquitoes, birds, horses and humans in the area surrounding the Po river delta



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# Evolution of integrated surveillance

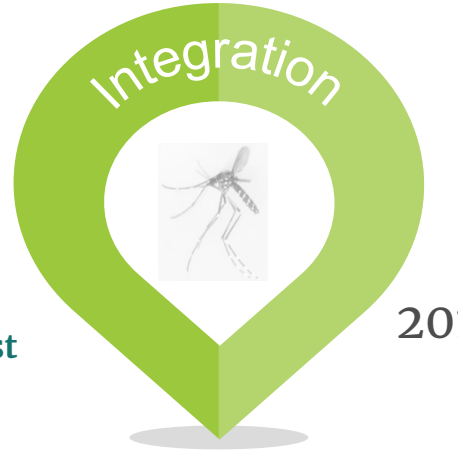

2008-2013


Risk based approach

2014

2016

National Integrated Monitoring Plan for West Nile Virus and Response




2017

Integrated WNV and USUV national integrated surveillance and response plan

2020-2025


National Plan for Prevention, Surveillance and Response to Arbovirus

updated yearly

# 2020

- WNV and USUV surveillance are included in the **National Plan for Prevention, Surveillance and Response to Arbovirus 2020-2025 (PNA).**
- The PNA integrates in a unique document the **surveillance measures** to be implemented at the national level for autochthonous and imported arboviruses.
- Promote a collaborative, multi-sectoral, and trans-disciplinary approach working at the local, regional, national, and global levels.
- Recognize the interconnection between people, animals, plants, and their shared environment. **(One Health approach).**

**Piano Nazionale di prevenzione, sorveglianza e risposta alle Arbovirosi (PNA) 2020-2025**

***Integrazione della prevenzione, sorveglianza e risposta alle arbovirosi in altre politiche:*** tale capitolo permette una visione più ampia delle problematiche relative alle arbovirosi, individuando sia i documenti prodotti dal Ministero della Salute, sia le strategie implementate da altre amministrazioni, con particolare riferimento al Ministero dell'Ambiente e della Tutela del Territorio e del Mare, all'Istituto Superiore di Sanità, all'Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale" e alla rete degli Istituti Zooprofilattici Sperimentali, all'Istituto Superiore per la Protezione e la Ricerca Ambientale, alla Rete Città Sane dell'OMS e al Ministero dell'Istruzione dell'Università e della Ricerca, con cui è possibile attivare sinergie e promuovere interventi congiunti.

***Prevenzione:*** individua i principali interventi di prevenzione da attuare per tutte le arbovirosi oggetto del Piano, suddividendoli in: comunicazione del rischio, formazione, misure ambientali, misure di contrasto ai vettori, vaccinazione, raccomandazioni organizzative.

***Sorveglianza e risposta ai virus West Nile e Usutu:*** aggiorna le indicazioni fornite con la circolare ministeriale n. 10381 del 05 aprile 2019.

***Sorveglianza e risposta alle arbovirosi trasmesse da zanzare invasive (Aedes sp.) con particolare riferimento ai virus Chikungunya, Dengue e Zika:*** aggiorna le indicazioni fornite con la circolare ministeriale n. 6036 del 27 febbraio 2019.

***Sorveglianza e risposta ai virus dell'encefalite virale da zecche, Toscana e ad altri arbovirus non sottoposti a specifici interventi di sorveglianza e risposta:*** aggiorna ed amplia le indicazioni fornite con la circolare ministeriale n. 6036 del 27 febbraio 2019.

***Sorveglianza di nuove specie invasive, potenziali vettori:*** istituisce la sorveglianza delle zanzare invasive a livello nazionale integrando le indicazioni fornite dalla Linee guida per l'identificazione e la sorveglianza dei siti a rischio di introduzione prodotte nell'ambito del progetto CCM 2014 "Prevenzione delle malattie a trasmissione vettoriale: sviluppo e implementazione pilota di strumenti di supporto" con i provvedimenti normativi nazionali ed internazionali vigenti in materia di specie invasive.

***Monitoraggio della resistenza agli insetticidi:*** fornisce indicazioni per attivare, nell'arco temporale coperto dal PNA, tale monitoraggio.

***Indicazioni temporali sull'implementazione del PNA e valutazione:*** fornisce indicazioni sui tempi entro cui devono essere implementate le misure previste dal PNA ed include i criteri di valutazione che verranno adottati.

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# Risk-based ranking of the Italian provinces

*High transmission risk area*

Territories (Provinces NUT-3) where WNV is circulating or has circulated in at least one of the 5 years before the publication of the plan as well as the surrounding areas.

*Low transmission risk area*

Territories (Provinces NUT-3) where WNV has never been/rarely reported, which have eco-climatic condition favorable to viral circulation

*Minimum transmission risk area*

Territories (Provinces NUT-3) where WNV has never or rarely reported and where eco-climatic conditions are not suitable to WNV circulation

# WNV and Usuv surveillance: the Italian model

Veterinary surveillance is focused on the following components:

- ✓ Surveillance of resident birds of target species (**Magpie, Carrion Crow and Eurasian jay**) in **High** and **Low risk** areas
  - ✓ alternatively in Low risk areas surveillance can be conducted on rural or open air poultry rearing units.
- ✓ Entomological surveillance. **High** and **Low risk** areas (1 trap/20X20 km)
- ✓ Horses clinical surveillance. **(whole country)**
- ✓ Wild bird mortality surveillance **(whole country)**

To guarantee harmonization and representativeness of the data collected within active surveillance each province (NUT-3) is divided in units of 1200-1600 km2 and activities referred to each unit.

# WN infection clinical suspicion/ surveillance activities within National Plan

**Official veterinarian**

- coordinated on a regional level
- implemented surveillance activities
- collect each type of species (bird, horse, mosquitoes)
- notify suspected in SIMAN
- Send samples to IIZZSS
- notify confirmed outbreaks in SIMAN

**IIZZSS**

- at regional level
- tested each type of samples/species (bird, horse, mosquitoes)
- In case of positivity, send the samples to CESME

**CESME**

- At national level
- Confirms suspected specimens
- Verify the correctness of notifications in SIMAN
- Communicate the outbreak to the Ministry of Health
- Communicate the outbreak to National Italian blood Centre and National Italian transplant Centre
- Report the outbreaks to international bodies
- Divulgate the epidemiological situation to general public




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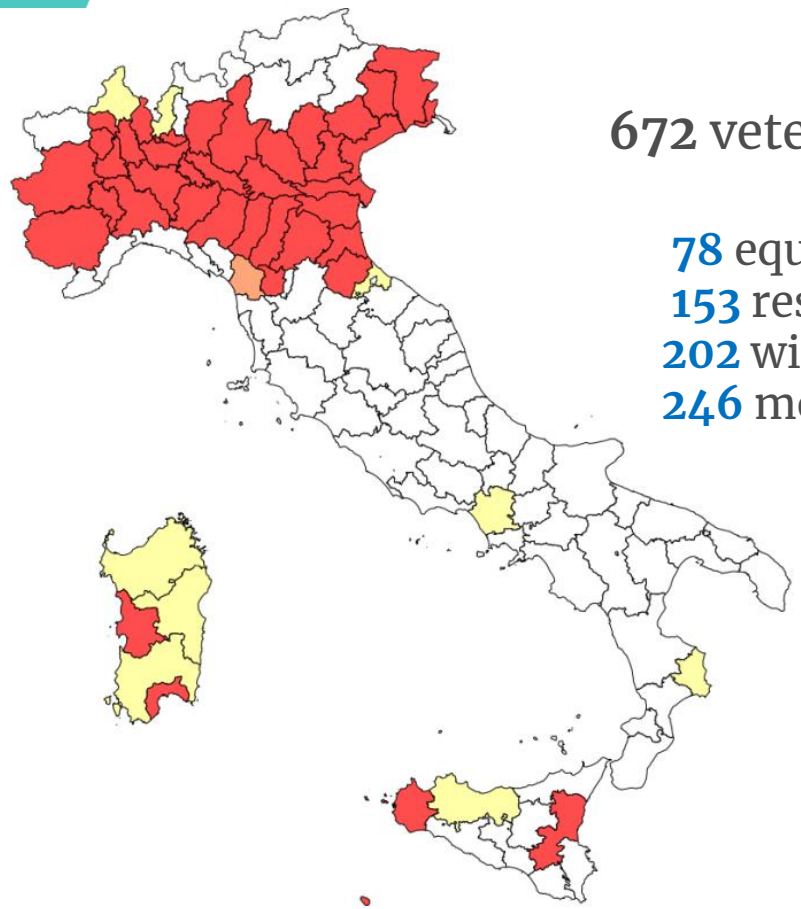
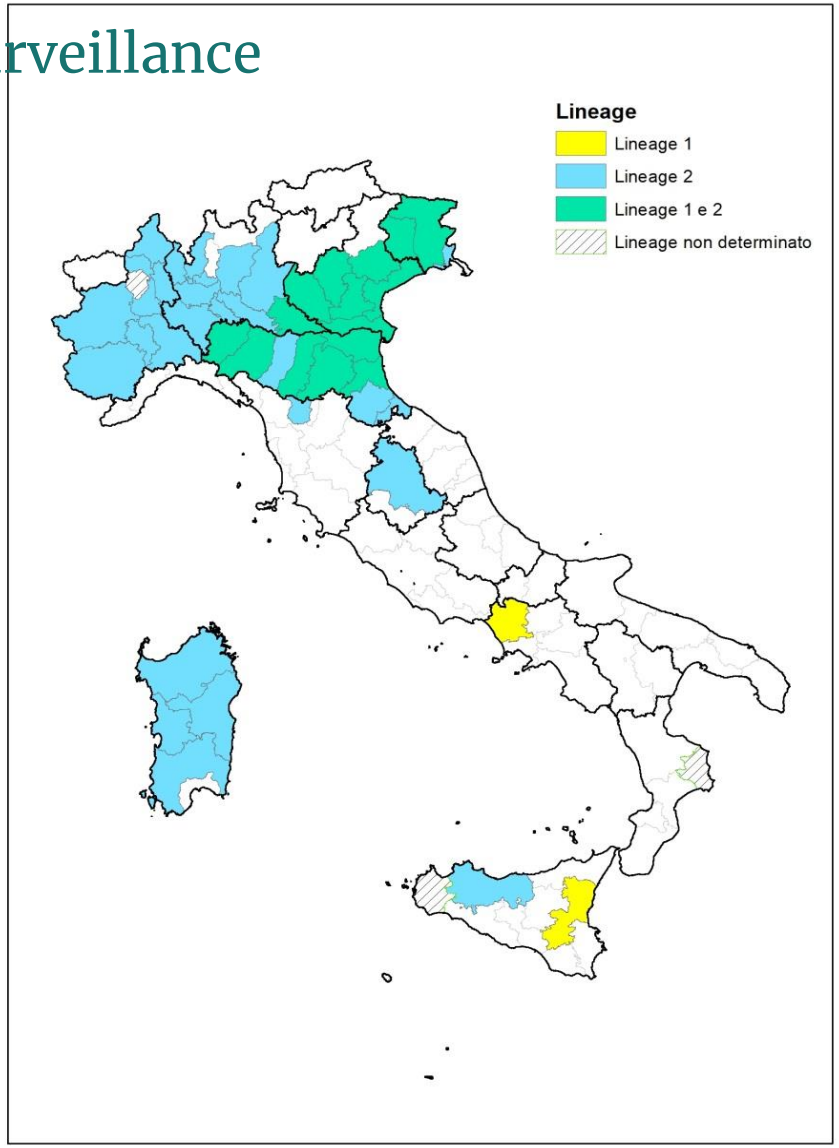
# WNV numbers: the results of 2022 surveillance



**672** veterinary cases

**78** equids
**153** resident birds
**202** wild birds
**246** mosquito pools



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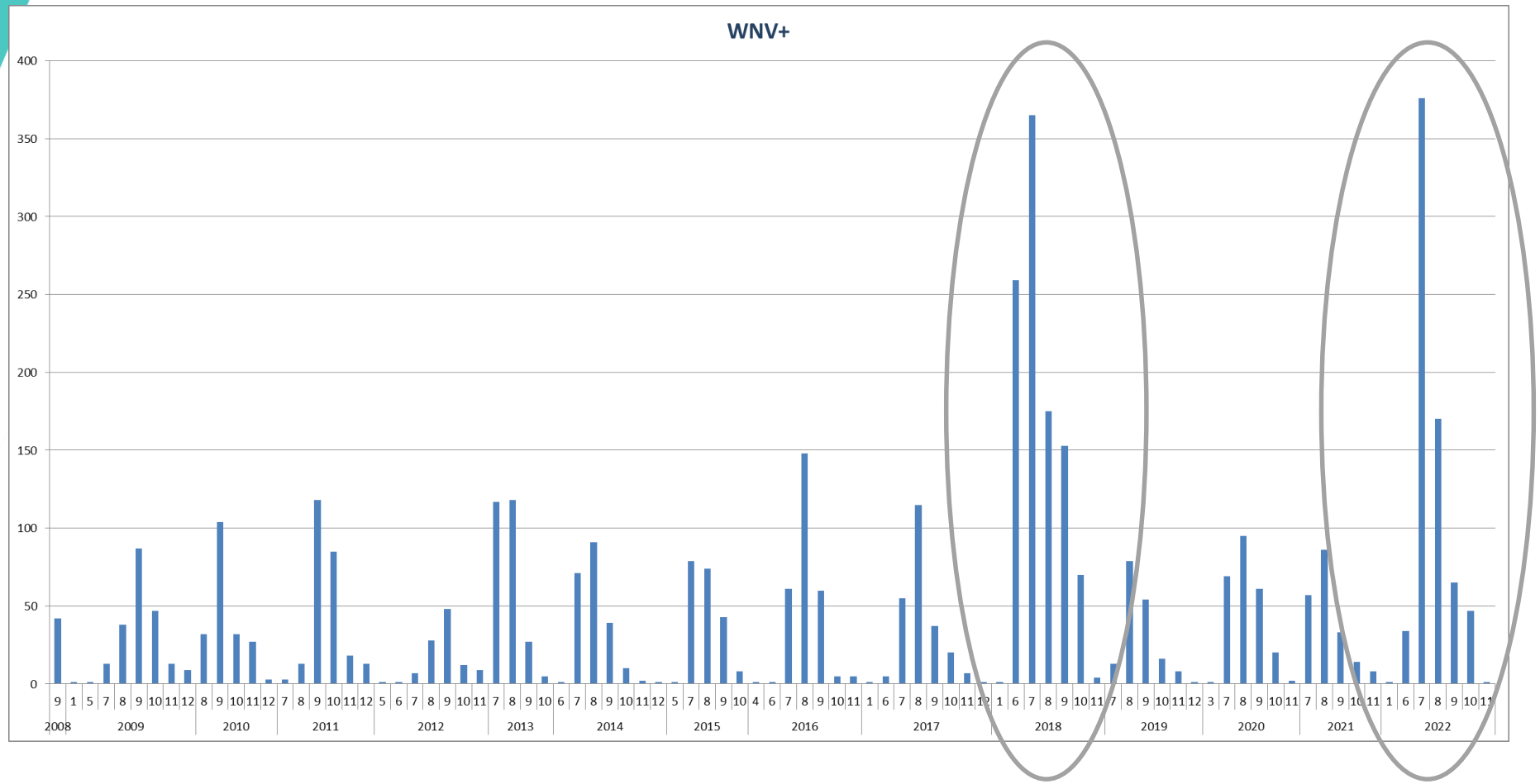
# Veterinary cases 2008-2022



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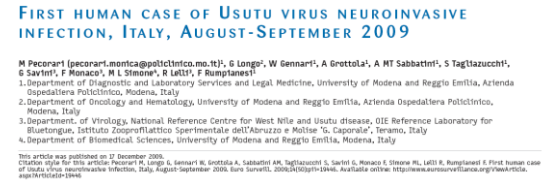
# Not only WNV: Usutu virus

- Since 2009 the Italian surveillance system has been capable to detect also the circulation of the Usutu virus
- USUV is a flavivirus belonging to the same antigenic group (serological cross-reaction)
- Transmitted by mosquitoes particularly Culex genus (*Culex pipiens*)
- Wild birds act as reservoirs but some avian species are highly susceptible –mass mortality (Austria 2001)
- Humans are dead-end host with sporadic neurological symptoms in immunocompromised patients



First human case of Usutu virus neuroinvasive infection, Italy, August-September 2009

M Pecorari[1] (pecorari.monica@policlinico.mo.it)[1], G Longo[2], W Gennari[2], A Grottola[2], A MT Sabbatini[2], S Tagliazucchi[2], G Savini[3], F Monaco[3], M L Simone[4], R Lelli[3], F Rumpianesi[3]

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This article was published on 17 December 2009.
Citation style for this article: Pecorari M, Longo G, Gennari W, Grottola A, Sabbatini AM, Tagliazucchi S, Savini G, Monaco F, Simone ML, Lelli R, Rumpianesi F. First human case of Usutu virus neuroinvasive infection, Italy, August-September 2009. Euro Surveill. 2009;14(50):pii=19446. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19446

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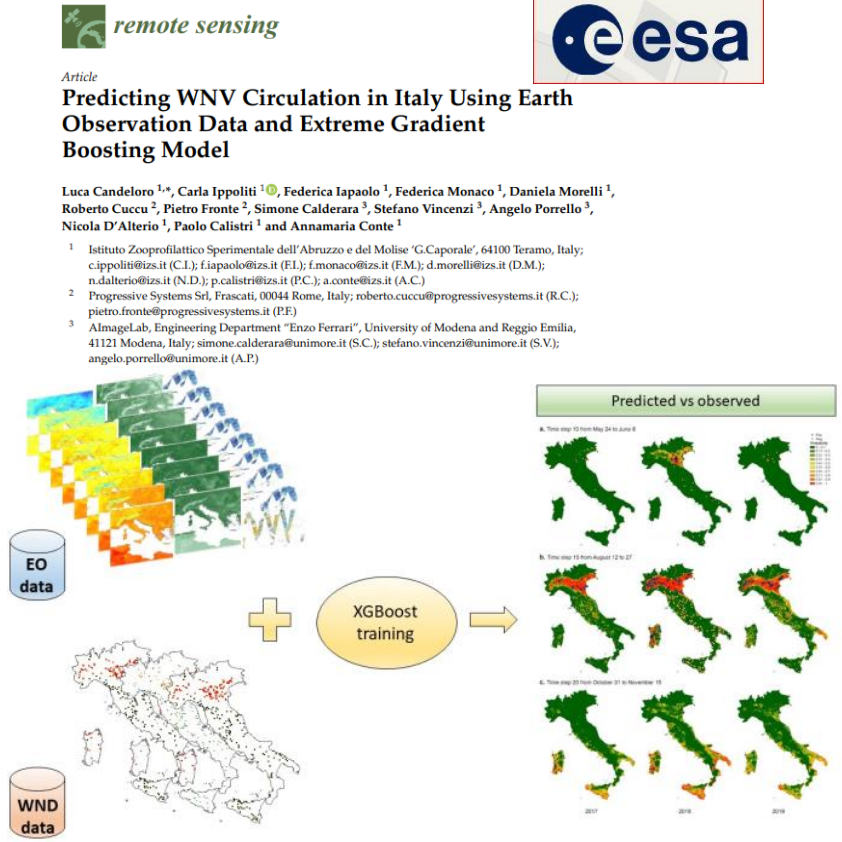
# AIDEO: AI and EO as Innovative Methods for Monitoring West Nile Virus Spread

aideo

Funded by esa

The recent and massive availability of **Earth Observation (EO)** data and the continuous development of innovative **Artificial Intelligence (AI) methods** can be of great help

- to **automatically identify patterns** in big datasets
- to **make highly accurate predictions**
- to **define intervention priorities** within national diseases surveillance plans




**www.aideo.eu**
**https://eo4society.esa.int/projects/aideo/**

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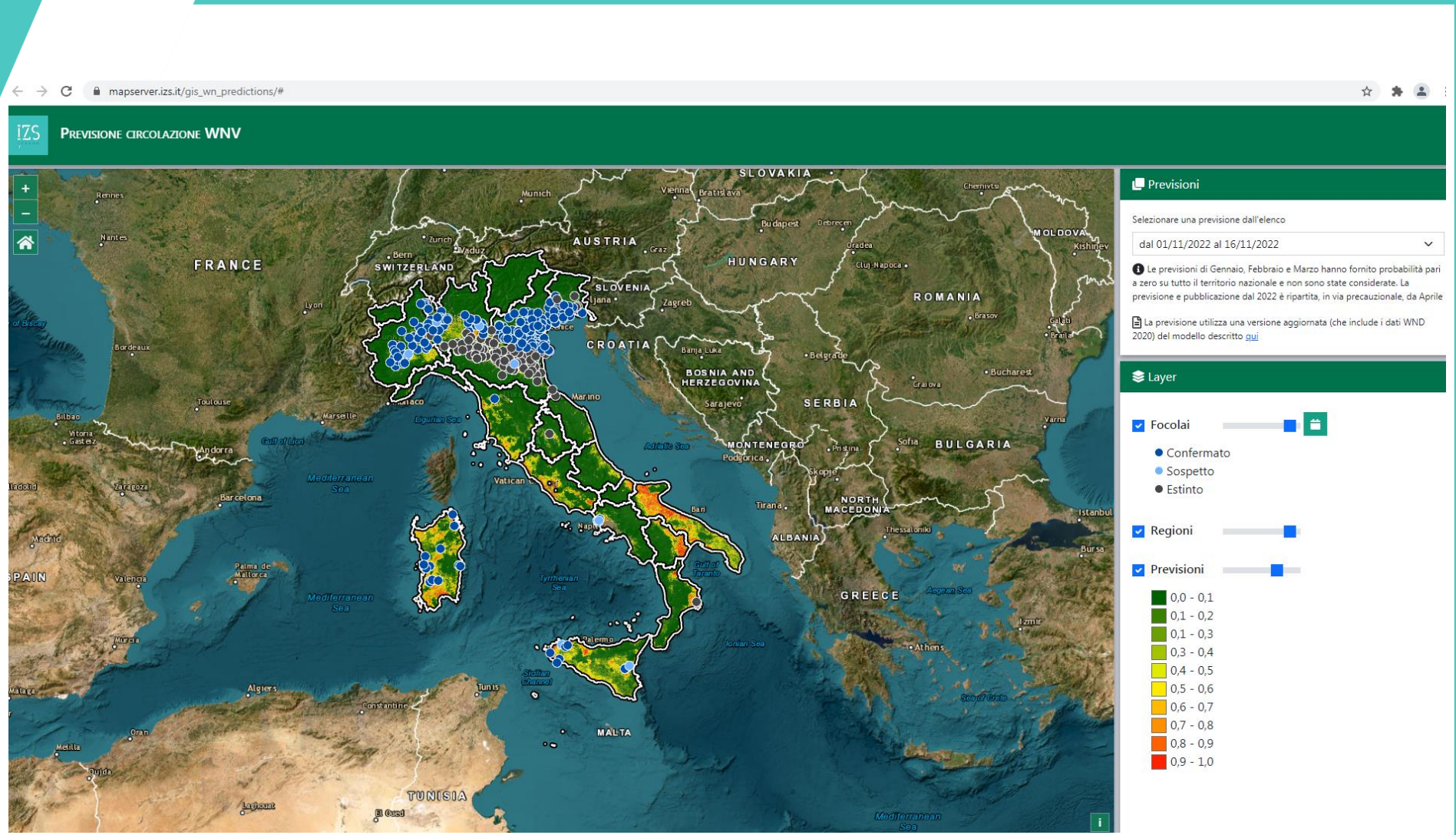


https://mapserver.izs.it/gis__wn__predictions/#

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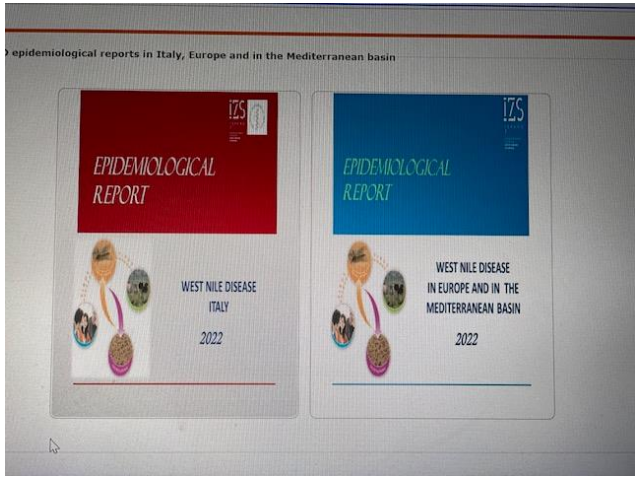
# Reports




https://westnile.izs.it/j6_wnd/home_en;jsessionid=B8411F8FCD15AE41083DC83B97BBB853


https://storymaps.arcgis.com/collections/5f04c28b7a264d31b53d9cc676b8a12b

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# Conclusions

Surveillance of WNV (and flaviviruses) circulation requires a **multidisciplinary effort**

- complexity of the epidemiological cycle

**Integration** of the veterinary, entomological and human surveillance systems is an essential public health tool

Entomological and veterinary surveillance are keys:

- to assess the associated human health risk
- to trigger a more timely and effective control of the disease in humans