

# VectorNet 3

The third iteration of the European network for  
medical and veterinary entomology

William Wint

ERGO

Bologna Modelling workshop

Sept 18 and 19, 2024

**VectorNet**

European Network  
for Medical and  
Veterinary Entomology



# What is VectorNet

A European network for sharing data on the geographic distribution, abundance and seasonality of arthropod vectors transmitting human and animal disease agents.

For and by medical and veterinary entomologists, public health professionals and veterinarians

A joint initiative of the European Food Safety Authority (EFSA) and the European Centre for Disease Prevention and Control (ECDC)



# VectorNet Past



Chikungunya  
assessment  
2006



Chikungunya  
Italy  
2007



Vborne  
project  
2008



Tigermaps  
2008–2009



VBORNET  
2009–2013



VectorNet 2014–2018



VectorNet 2019–2023



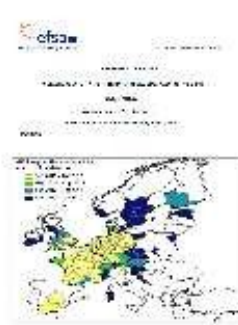
BTV 8  
2007



EHD  
2009



ASF  
2010



SBV  
2013



# Who are VectorNet 3

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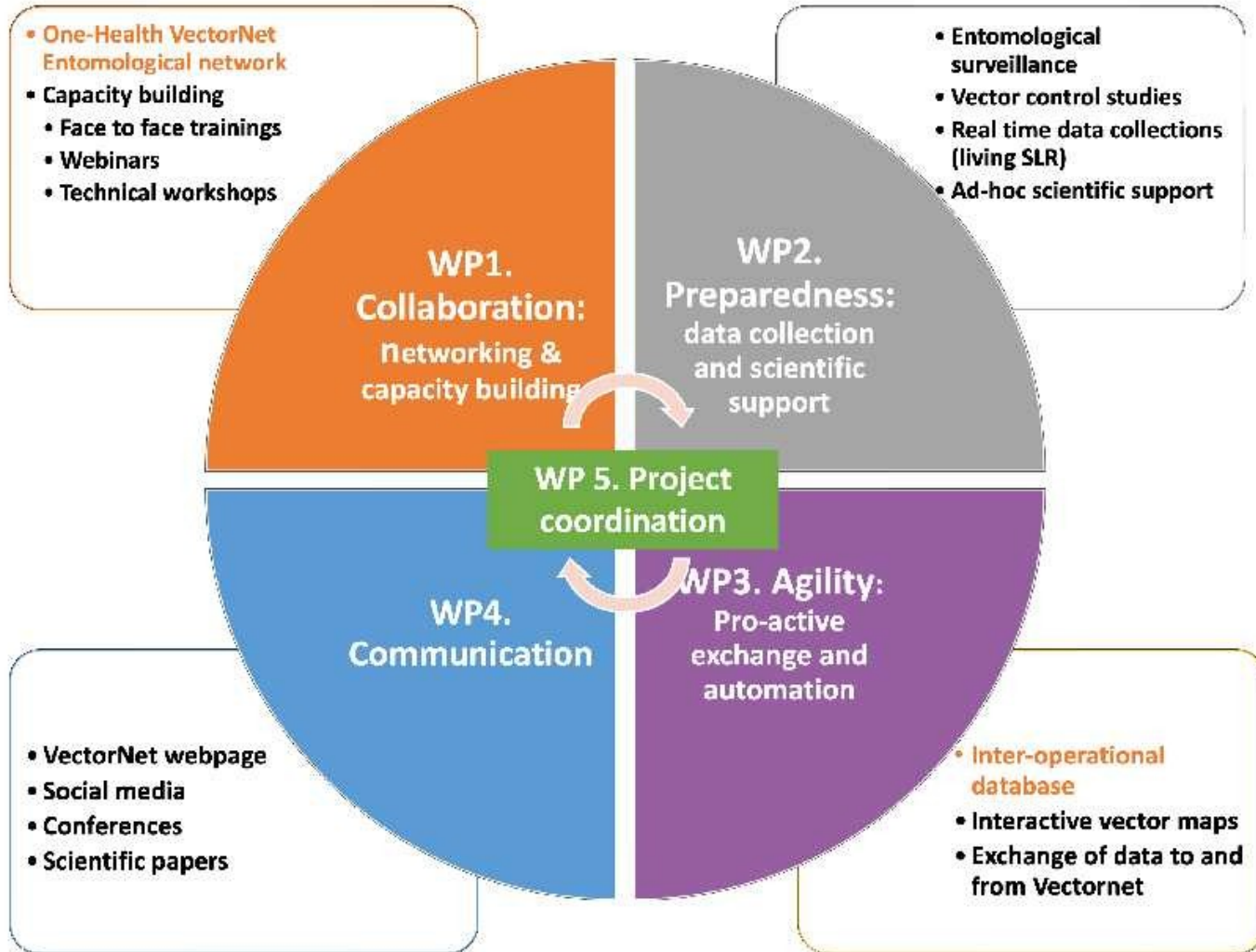
Universita di Roma

IZS "G. Caporale", IT

Avia-GIS, BE

Avia-GIS, BE

# VectorNet 3



Traditional Core Business

Distributions and Maps  
Capacity Building  
Expert Advice

Traditional Core Membership

National Network  
Professional Network  
Consortium  
International Agencies

# VectorNet Sept 23 Contributors

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# VectorNet 3 Evolution

## **Continuity**

- ▶ Update the distributions
- ▶ Capacity building and training
- ▶ Scientific advice

## **Update**

- ▶ Build a new One-Health Vectornet Entomology Network (OH-VEN)

incorporating EFSA and ECDC

appointees

- ▶ Reintroduction of targeted field work

## **New**

- ▶ RCT for the (cost)-effectiveness of vector control methods
- ▶ Absences and gap analyses
- ▶ Database dissemination: upload the database to GBIF

# VectorNet in the Field

- ▶ All field studies will be informed by the species-specific habitat suitability modelling and a gap analyses
- ▶ Field studies will be designed to be compatible with and complementary to those conducted in VectorNet 1

## **3 types of field studies**

- ▶ Short-term, targeted entomological surveillance
- ▶ Longitudinal, targeted entomological surveillance studies
- ▶ Studies to establish the (cost)-effectiveness of vector control methods



# VectorNet Sept 23 Parameters



Column Name
SourceID
VectorCategory
VectorSpeciesName
Country
LocationCode
LocationName
Longitude E/W
Longitude (degrees)
Longitude (minutes)
Longitude (seconds)
Longitude (decimal degrees) (X)
Latitude N/S
Latitude (degrees)
Latitude (minutes)
Latitude (seconds)
Latitude (decimal degrees) (Y)
User Entry Longitude (X)(decimal degrees)
User Entry Latitude (Y) (decimal degrees)
PrecisionLocation
VectorLifeStage
VectorSex
NumberOfVectorsCaught

Column Name
CollectionPlaceID
CollectionEffortStartDate
CollectionEffortEndDate
VectorCollectionMethod
CollectionEffortP1Value
UnitsEffortP1
CollectionEffortP2Value
UnitsEffortP2
VectorHostSpecies
Host Bodypart
VectorIdentificationMethod
ShelteredEnvironment
ReportedDistributionStatus
PathogenName
PathogenDetectionMethod
NumberOfVectorTested
PositivePathogenDetection
PathogenComment
SourceType
PublicationTitle
Author
YearOfPublication
DOI
VectorNetFieldStudyID
URL

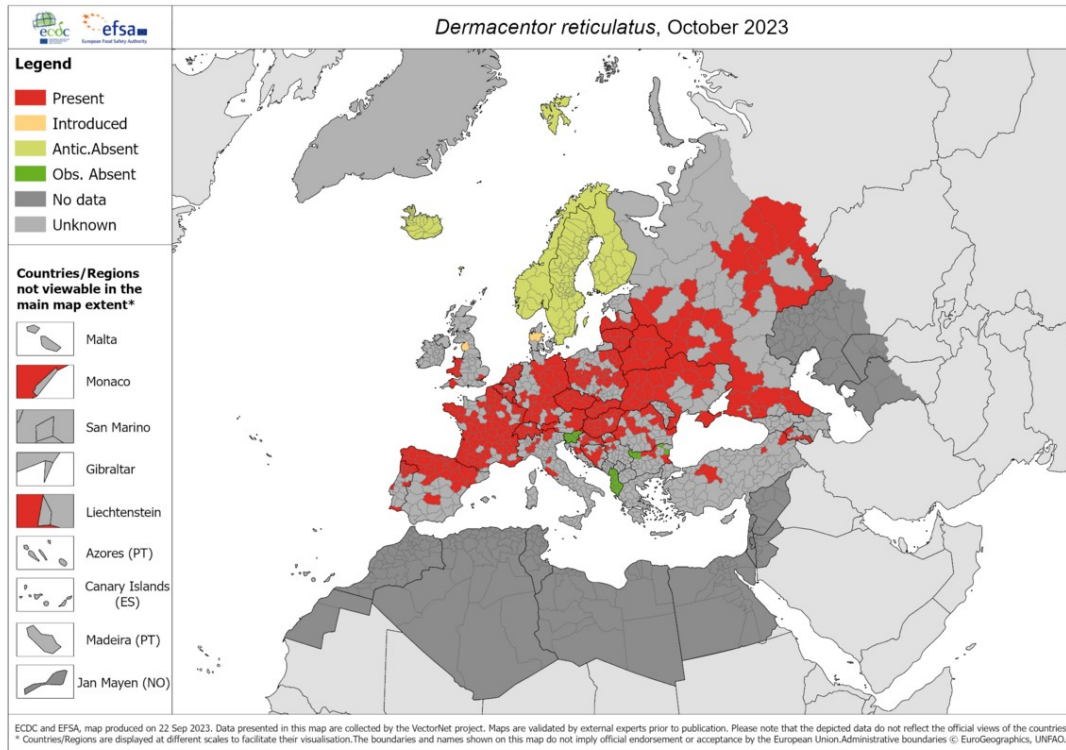
Column Name
NotesFromDataExpert
Data expert name
CollectionEffortStartDate_ddmmyy
CollectionEffortEndDate_ddmmyy
Submitter email (first row only)
LOCATION NAME
LOCATION CODE
LOCATION TYPE
VectorCategoryCode
Mosquito
Sandfly
Culicoides
Tick
PrecisionCoordinate
TrapTypeName
VectorCollectionMethodName
CollectionMosquitoAdults
CollectionMosquitoLarvae
CollectionMosquitoNymph_Pupa
CollectionMosquitoEggs
VectorDistributionStatusInvasive

Column Name
VectorIdentificationMethod
PathogenNameMosquito
PathogenDetectionMethod
VectorSex
VectorLifeStage
VectorInformationSourceType
VectorHostSpeciesName
ShelteredEnvironment
Longitude E/W
Latitude N/S
LocationCode
LocationName
LOOKUPTABLEUNITS
CollectionTickAdultsNymphsLarvae
CONCATENATED
Unit1
Unit2
Unit3

# VectorNet Sept 23 Priority Species

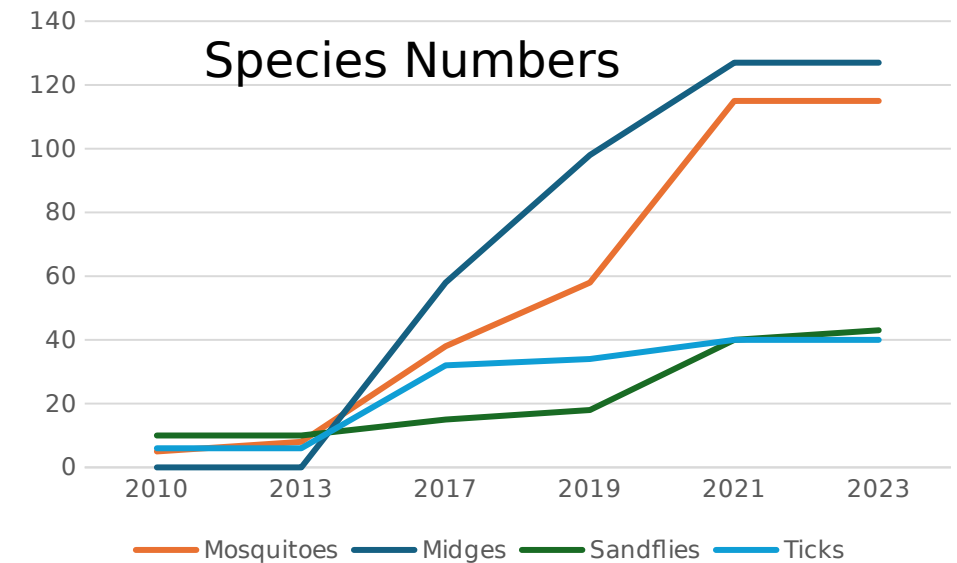
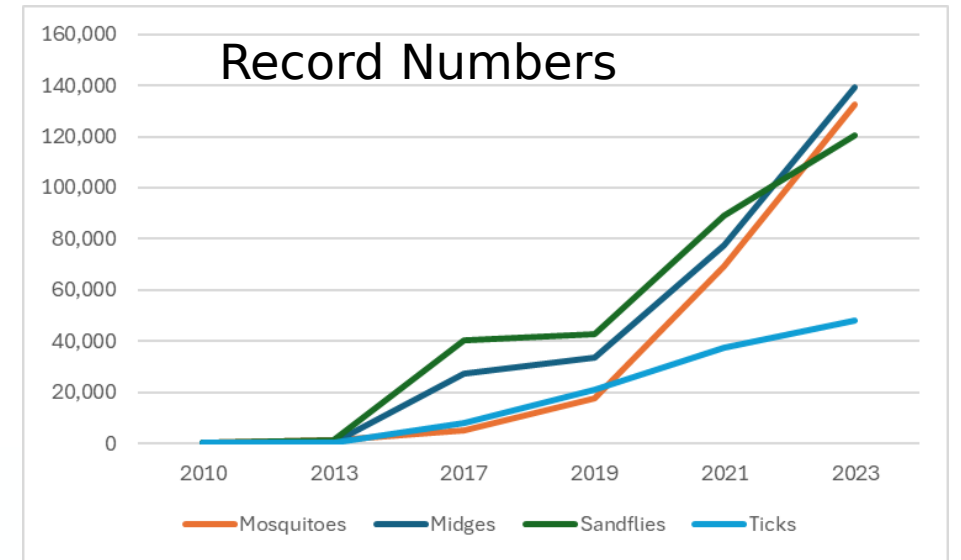
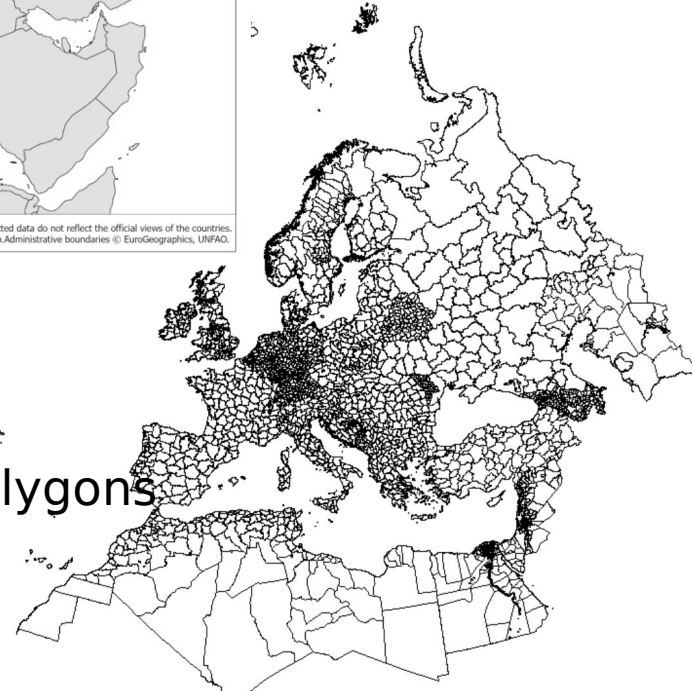
Midges	Ticks	Sandflies	Mosquitoes	
Culicoides chiopterus	Dermacentor reticulatus	Phlebotomus alexandri	Aedes aegypti	Coquillettidia richiardii
Culicoides dewulfi	Hyalomma lusitanicum	Phlebotomus ariasi	Aedes albopictus	Culex antennatus
Culicoides imicola	Hyalomma marginatum	Phlebotomus langeroni	Aedes caspius	Culex modestus
Culicoides kingi	Ixodes persulcatus	Phlebotomus major s.l.	Aedes detritus	Culex molestus
Culicoides lupicaris	Ixodes ricinus	Phlebotomus mascittii	Aedes coluzzi	Culex perexiguus
Culicoides newsteadi s.l.	Ornithodoros erraticus	Phlebotomus neglectus	Aedes japonicus	Culex pipiens
Culicoides obsoletus s.l.	Rhipicephalus sanguineus s.l.	Phlebotomus papatasi	Aedes koreicus	Culex theileri
Culicoides pulicaris s.l.		Phlebotomus perfiliewi	Aedes vexans s.l.	Culex torrentium
Culicoides punctatus s.l.		Phlebotomus perniciosus	Aedes vexans vexans	Culex tritaeniorhynchus
Culicoides scoticus		Phlebotomus sergenti	Anopheles atroparvus	Culex univittatus
		Phlebotomus similis	Anopheles claviger	Culiseta annualata
		Phlebotomus tobbi	Anopheles labranchiae	
			Anopheles maculipennis s.l.	
			Anopheles maculipennis s.s.	
			Anopheles messeae	
<b>leader:</b> <b>Thomas Ballenghien</b>	<b>leader:</b> <b>Annapaola Rizzoli</b>	<b>leader:</b> <b>Vít Dvořák</b>	Anopheles plumbeus	<b>leader:</b> <b>Francis Schaffner</b>
<b>deputy:</b> <b>Maria Goffredo</b>	<b>deputy:</b> <b>Kayleigh Hansford</b>	<b>deputy:</b> <b>Bulent Alten</b>	Anopheles sacharovi	<b>deputy:</b> <b>Ale della Torre</b>
			Anopheles superpictus	

# VectorNet Data Sept 23



A typical VN Map

Analysis and Data entry polygons



# VectorNet Data for Modelers

## Targets

Ticks, Mosquitos, Sandflies, Biting Midge, ~ 40 Priority Species, > 340 Total

## Data

Distributions  
Point and Polygon  
Numbers  
Sample Effort  
Absences

## Data sources

Network  
Literature  
Field

## Outputs

Maps  
Database

## Processes

**Expert Validation**

# VectorNet3 for Modelers

Database to be made more accessible and reliable

- ▶ Database to be cleaned

- ▶ More focus on point data

- ▶ Data to be enhanced -

  - absences (inferred and threshold limits),  
gaps

  - surveillance activities  
other data sources (OH national  
surveillance)

    - NB USP only Validated data?

- ▶ Database to be more accessible

  - directly ?? via API

  - via GBIF

  - via Interactive Maps

  - via regular flat file and shapefile

# VectorNet3 Absences

Spatial and environmental -

climate thresholds, spatial inference.

Inferred from point data records - if record for 1, using particular method, then  
reported ? infer zero for ones not

a) Point Sampling effort sufficient

b) Same sampling methods are effective for source species  
inferred

c) Temporal and spatial activity patterns same

d) minimum sampling periods within expected seasonal  
presence

e) complete reporting/identification of all species in published  
reports confirmed -- would require retrospective validation  
of existing records . ? new lit records could flagged with  
absence generation tags

# VectorNet unused Potential

Seasonality - first and last records

Absences already mentioned

Abundances (not density) - potentially In future

Spread - only if/when absences reliably inferred

Targeted surveillance

? Gold standard for Citizen Science