

VectorNet-Update on arthropod vectors of medical and veterinary importance in Luxembourg

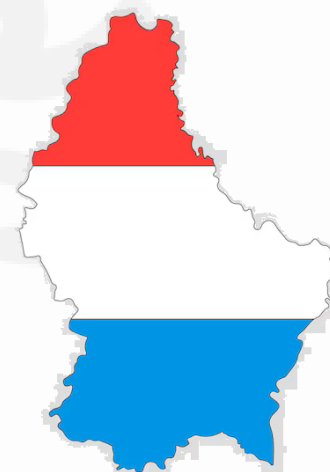
Alexander Weigand

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Naturmusée

09. Dezember 2025

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VectorNet



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VectorNet

since 2014

VectorNet European Network
for Medical and
Veterinary Entomology

➔ OneHealth Vector Entomological Network (OHVEN) installed by EFSA and ECDC

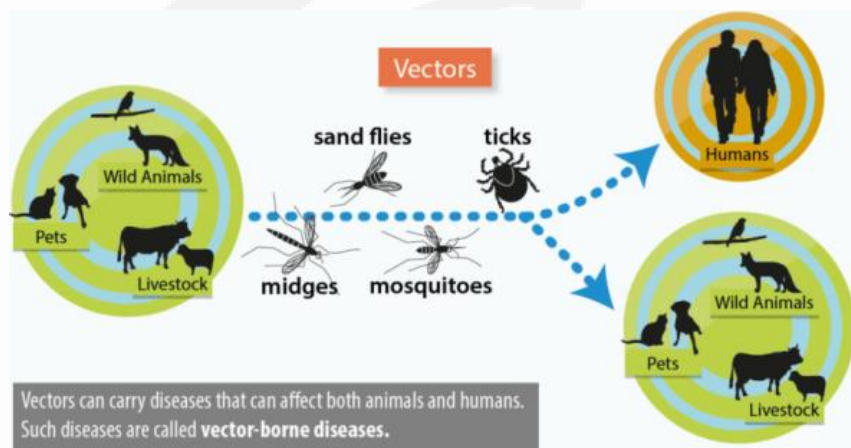
- goal to improve preparedness and response for vector-borne diseases
- sharing data for entomological vectors
geographic distribution; abundance; seasonality
- [Vectornetdata.org](https://vectornetdata.org)



VectorNet

- Collecting data for four vector groups
(mosquitoes, ticks, biting midges & sand flies)
- Priority species assessed
(= veterinary and medical importance)

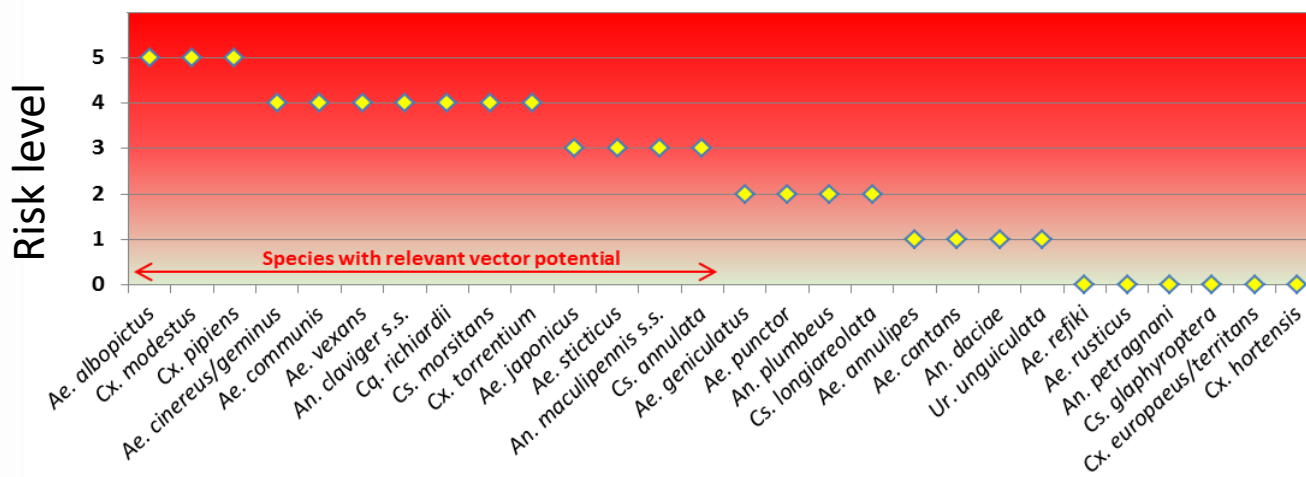
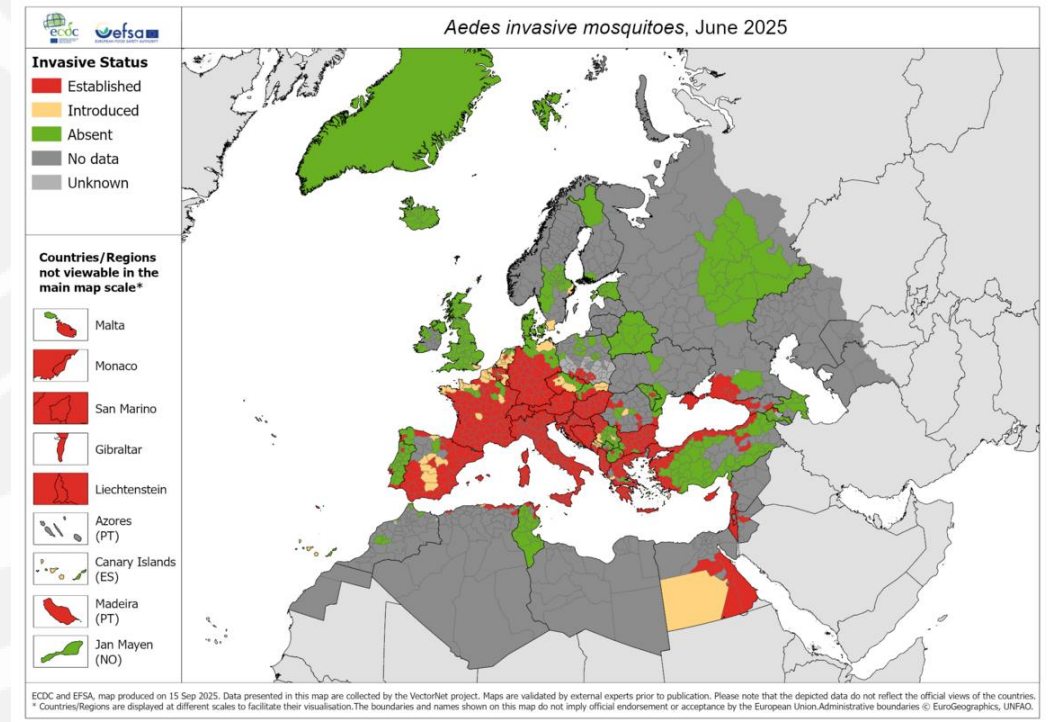
Vector group	# priority species
Mosquitoes	15
Ticks	7
Biting midges	10
Sand flies	10





Mosquitoes

- Priority invasive (*Aedes* spp., „tiger mosquitoes“)
- Priority native
(e.g. *Culex*, *Culiseta*, *Anopheles*, *Coquilleltidia*)
- 10/15 priority species present in LU



0 = Species not implicated
 1 = Species infected in nature only
 2 = Species competent in the laboratory only
 3 = Species infected in nature and competent, for the same pathogen
 4 = Species known as past/present vector in regions and countries outside Western Europe or, for malaria, secondary vector only
 5 = Species known as vector in Western Europe

Vectorial risk for human malaria parasites and eight arboviruses of public health relevance (Batai, chikungunya, dengue, Inkoo, Sindbis, Tahyna, West Nile, Zika)



Aedes invasive mosquitoes

Ae. albopictus – Asian tiger mosquito

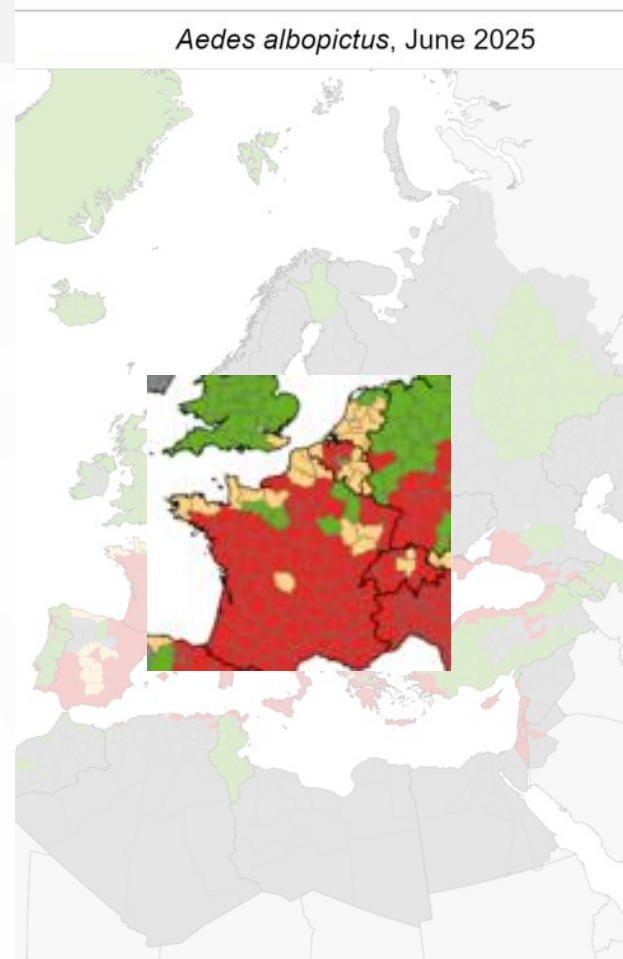
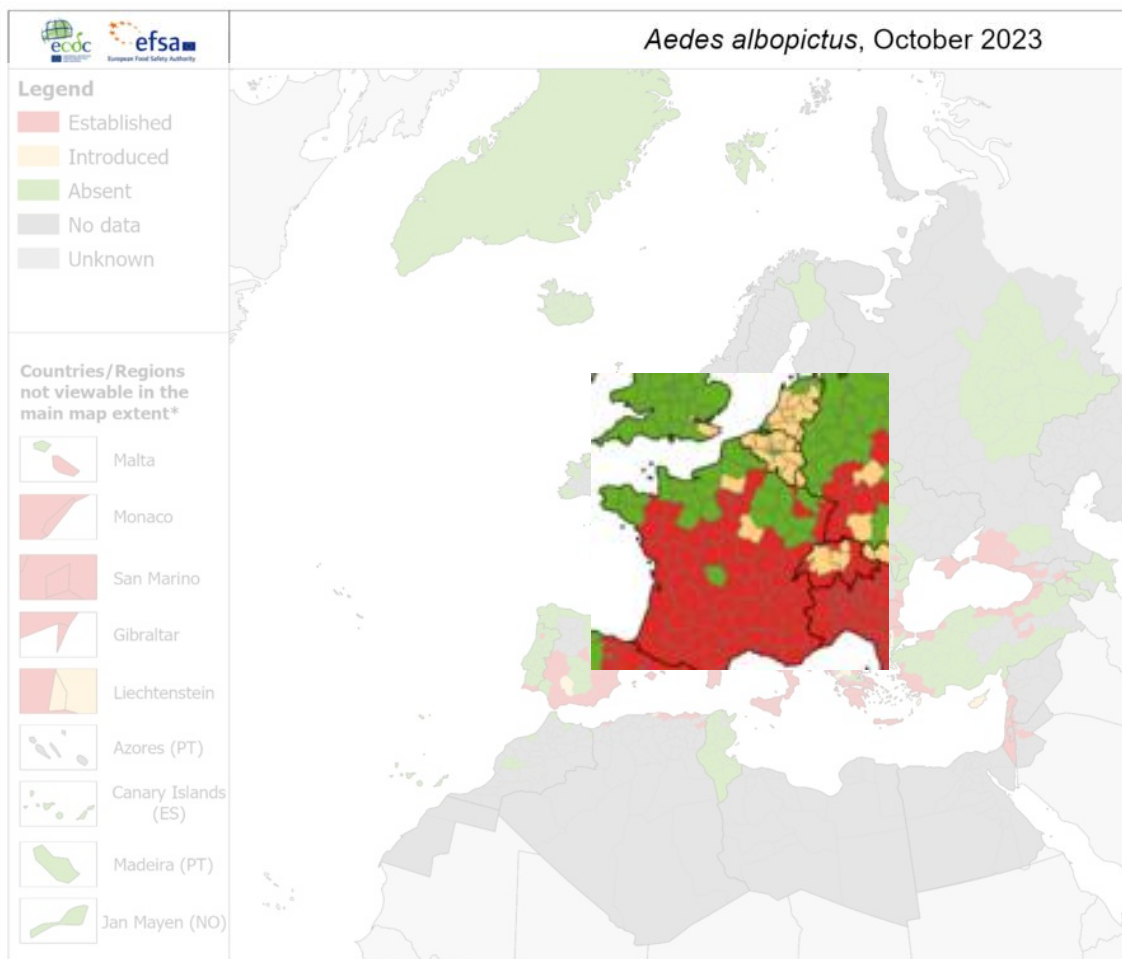
LU data

- First record **2022-09-03**, Berchem
- Repeatedly found in subsequent years
- Eggs found 2023-07, near Capellen



Vector potential
 Yellow fever virus
 Dengue fever virus
 Chikungunya fever virus

 several filarial nematodes



ECDC and EFSA, map produced on 6 Oct 2023. Data presented in this map collected by the VectorNet project. Maps are validated by external experts prior to publication. Please note that the depicted boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union.

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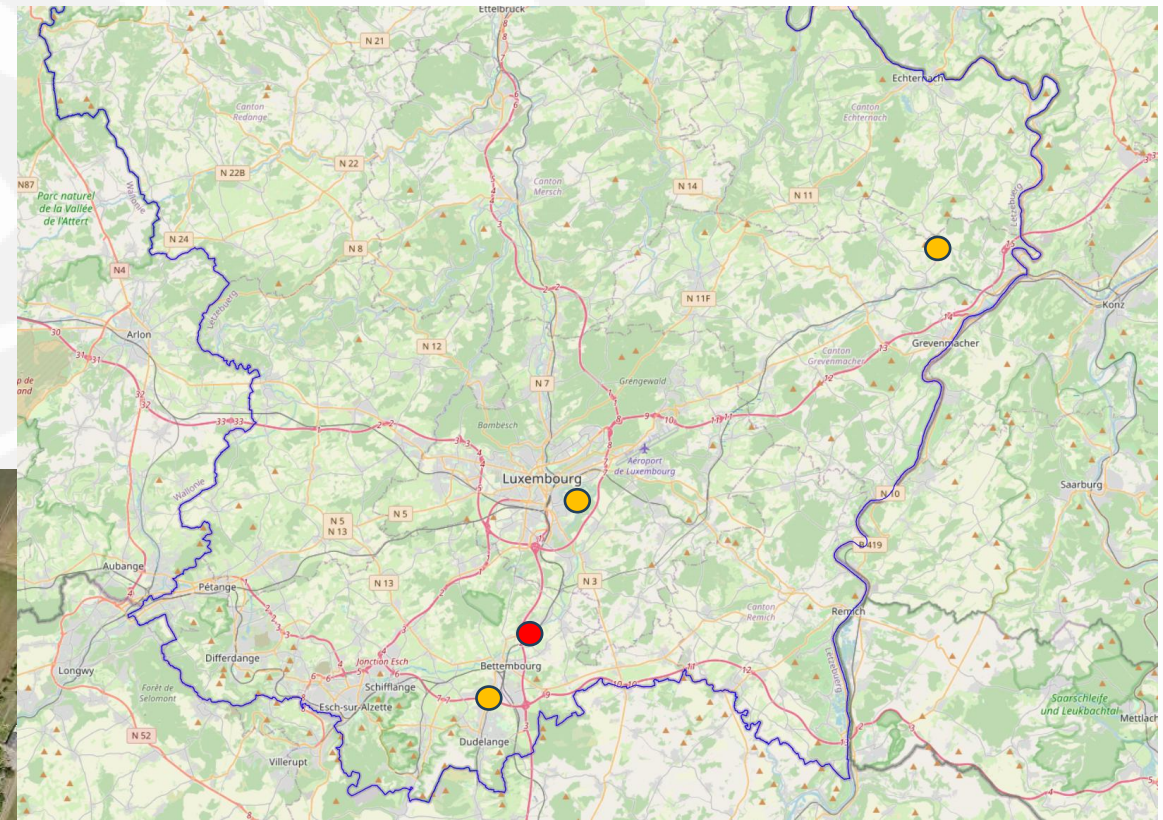
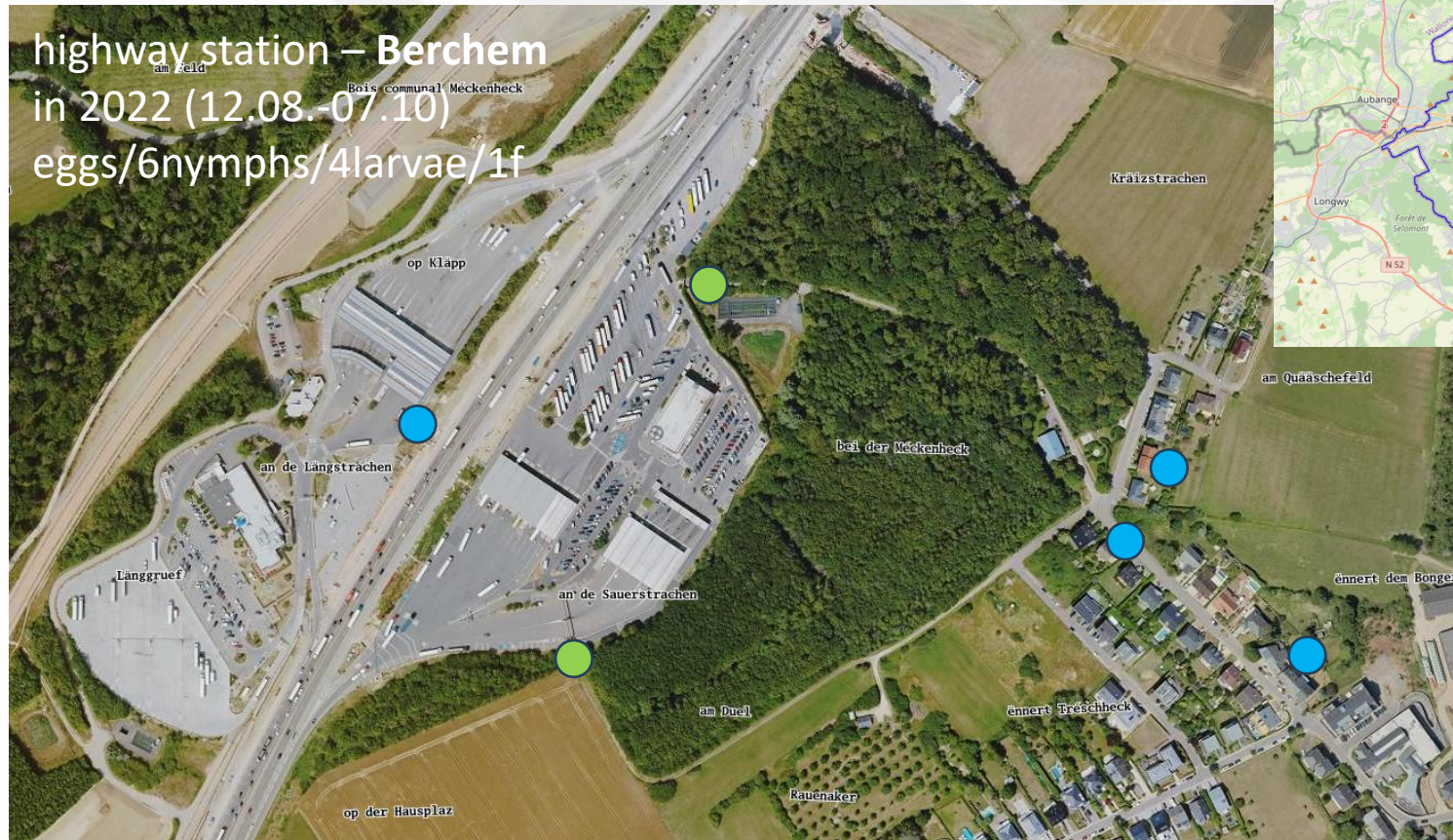


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Aedes albopictus



- Habitat removal, larval control Bti, door-to-door + surveillance, but also present in subsequent years
- Additional findings via surveillance activities and MosquitoAlert app

● ovitrap ● larval sampling



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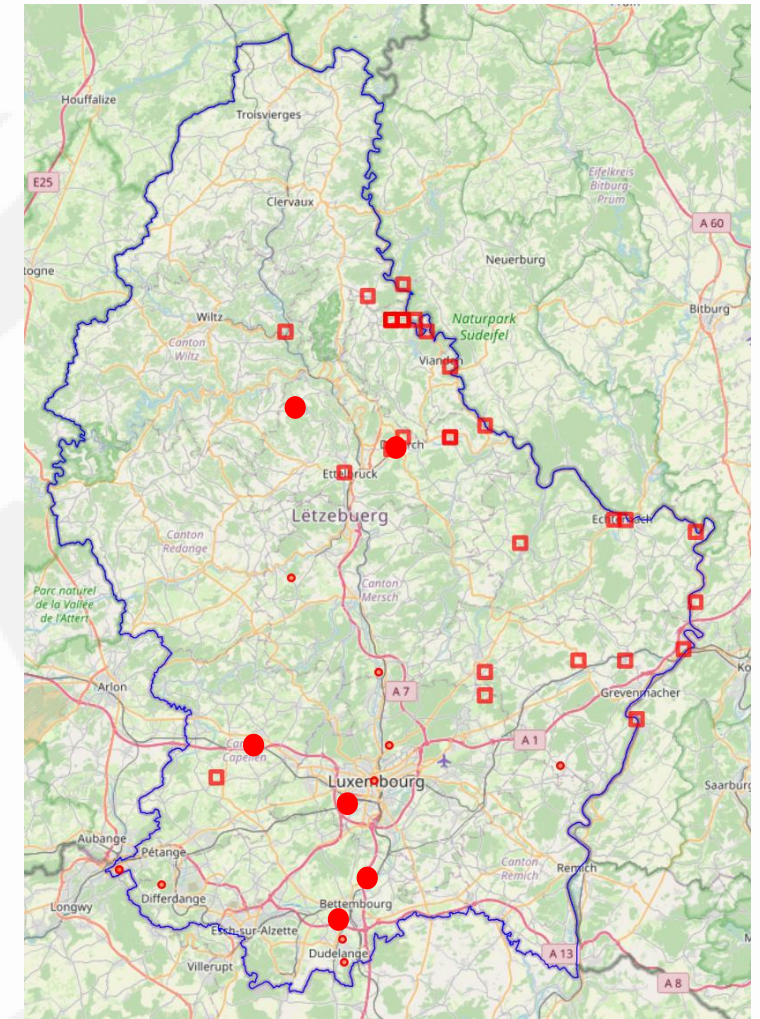
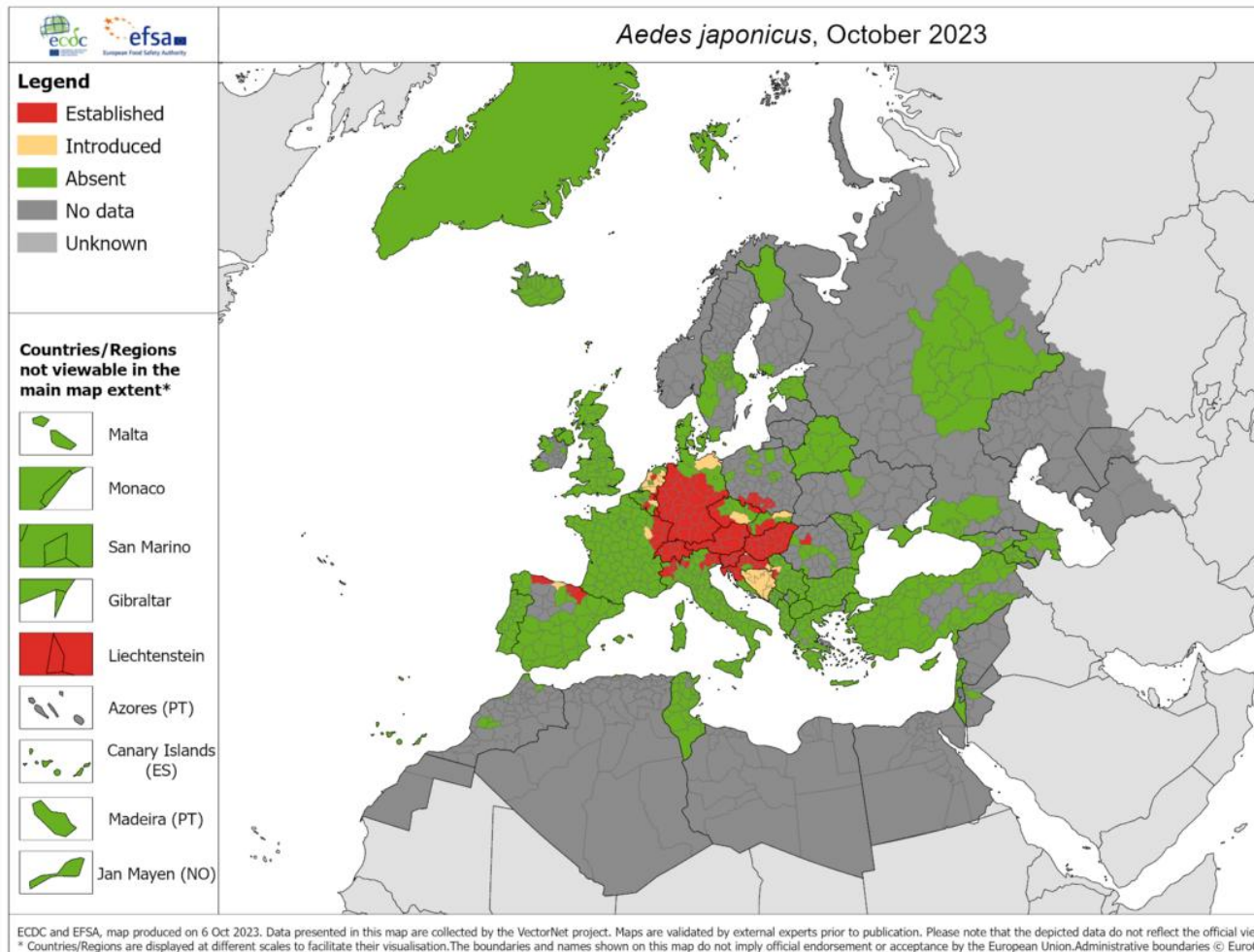
Aedes japonicus

Japanese bush mosquito
(less competent vector)



LU data

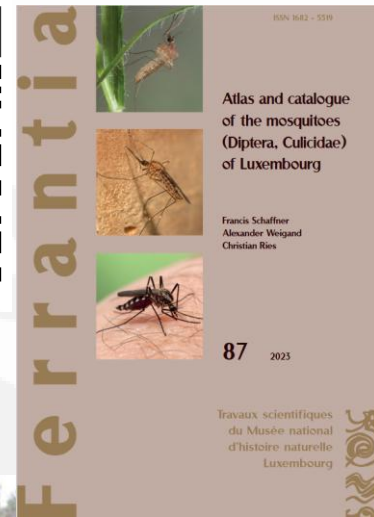
- First record **2018-07-04**, Stolzembourg
- First report in Europe 2000 (FR) – tyre depot
- Spreading from CH since 2008



mdata + GBIF + surveillance data

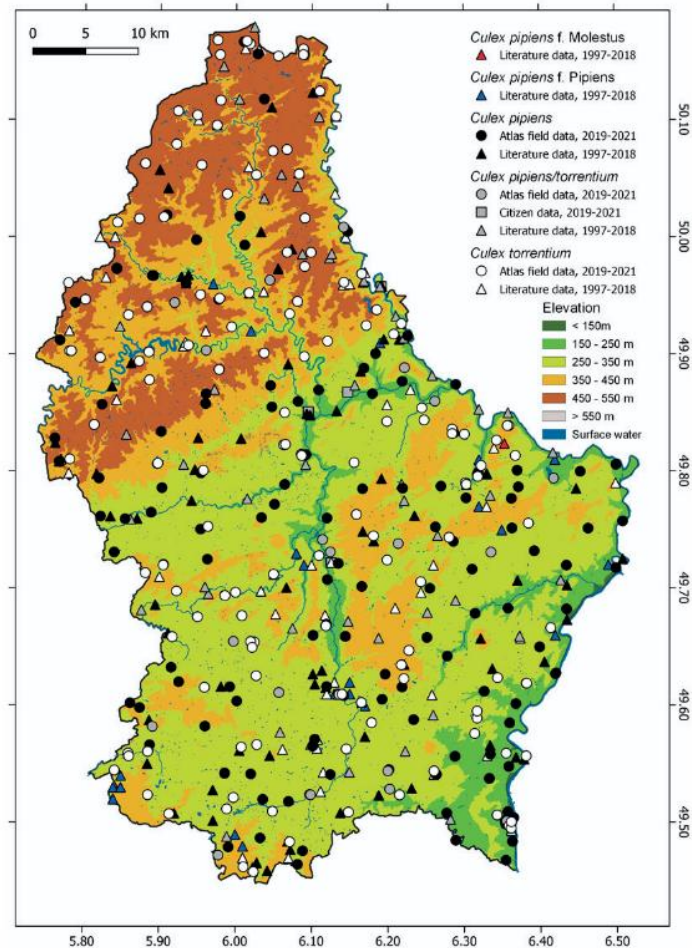


Culex mosquitoes



● *Cx. pipiens*

○ *Cx. torrentium*

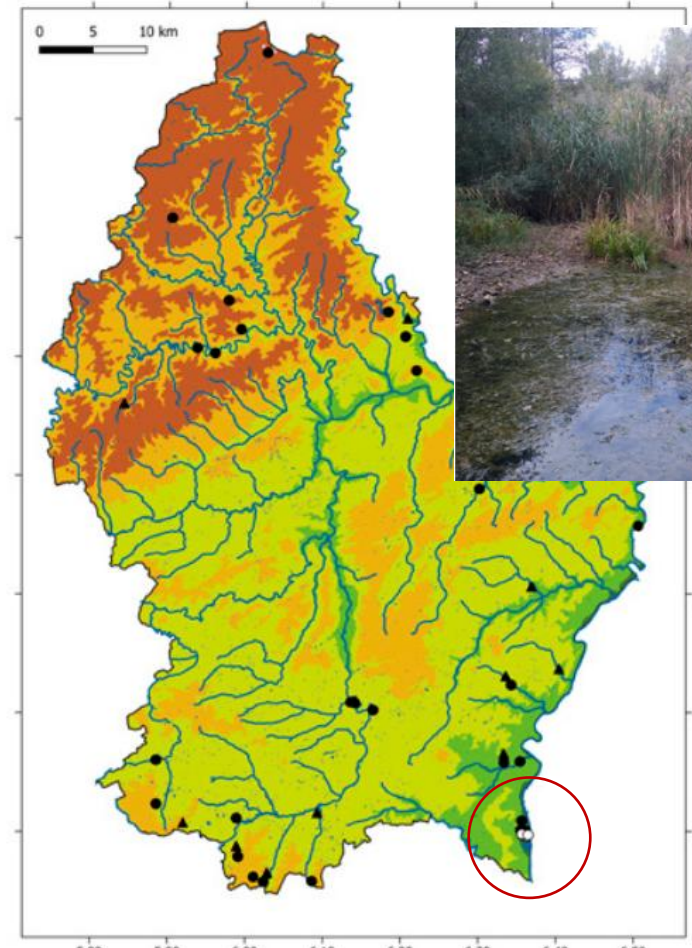


Vector potential
West Nile Fever virus
Usutu virus

Avian malaria
(*Plasmodium* spp.)

- Often found sympatric
- *Cx. torrentium* frequent in underground sites and uplands

○ *Cx. modestus*

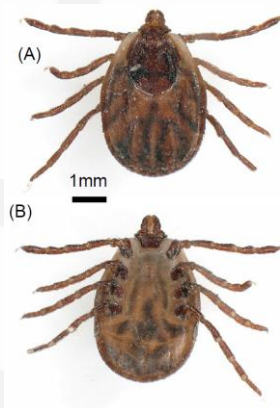


- 1 location, 2 sites
- in 2019, 2020, 2023 & 2025



Ticks

- 16 tick species in total recorded
- **4/7 priority species present in LU**
- Subterranean monitoring (inkl. bats) **since 2007**
- Bird ringing COL „Schlammwiss“ **since 2022**
- OH4Surveillance project LIH/ALVA (**2024-2026**)
- Citizen records / targeted survey on farm & park animals **in 2024**

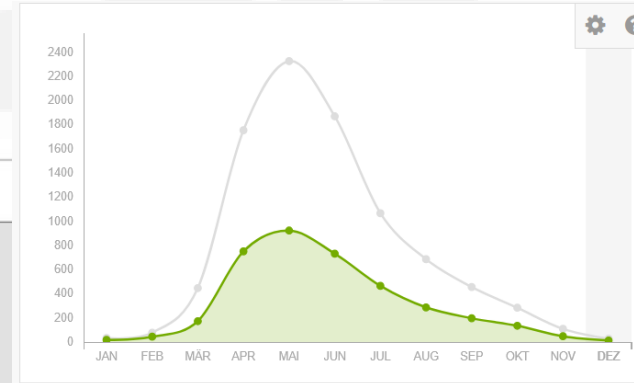
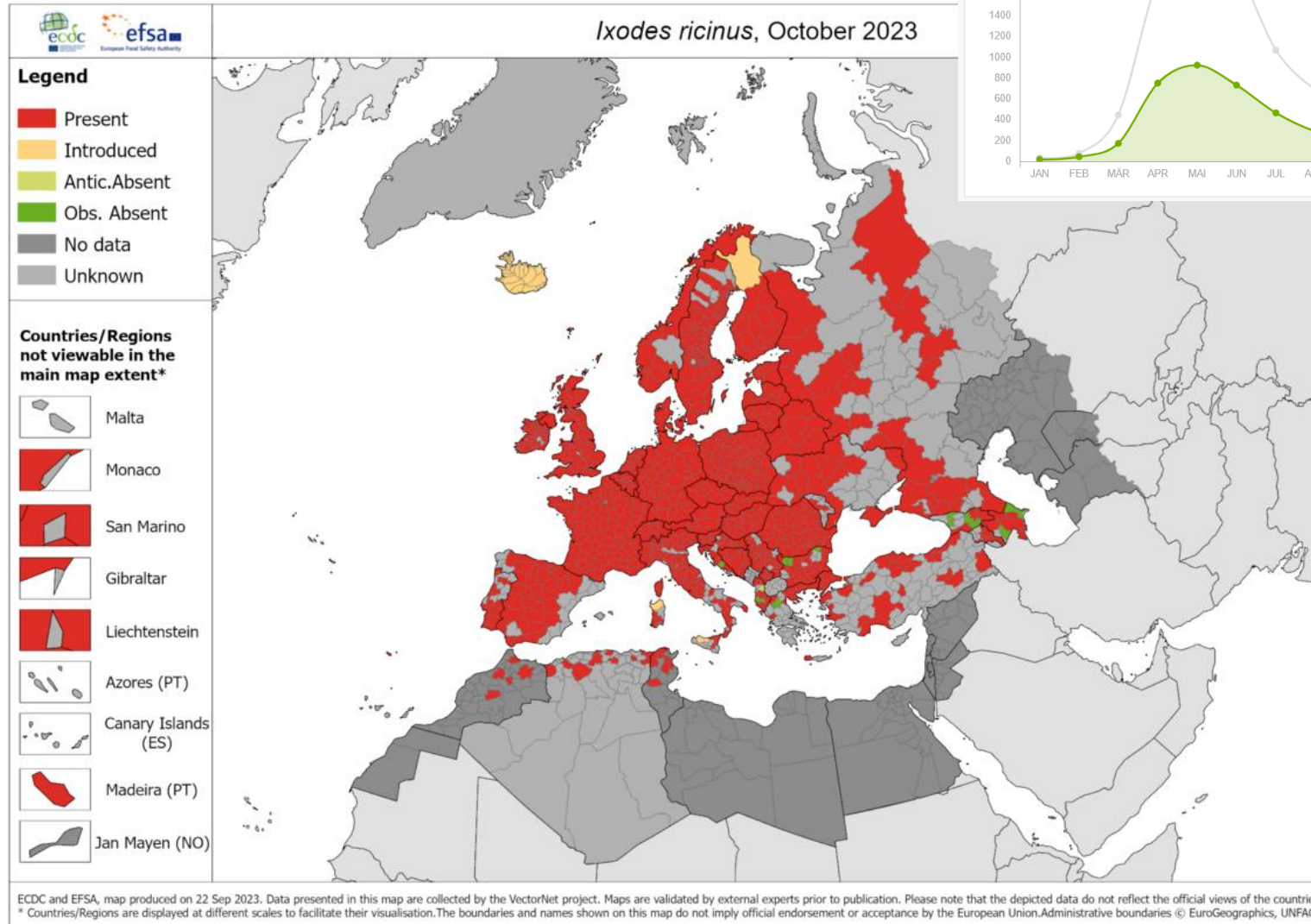


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Ixodes ricinus



LU data

Widespread and abundant throughout the country

Diverse hosts

Diverse environments

One4Health
SURVEILLANCE



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Vector potential

Borrelia burgdorferi -> Lyme disease

tick-borne encephalitis virus -> TBE

Anaplasma phagocytophilum -> Anaplasmosis

Babesia spp.

Rickettsia spp.

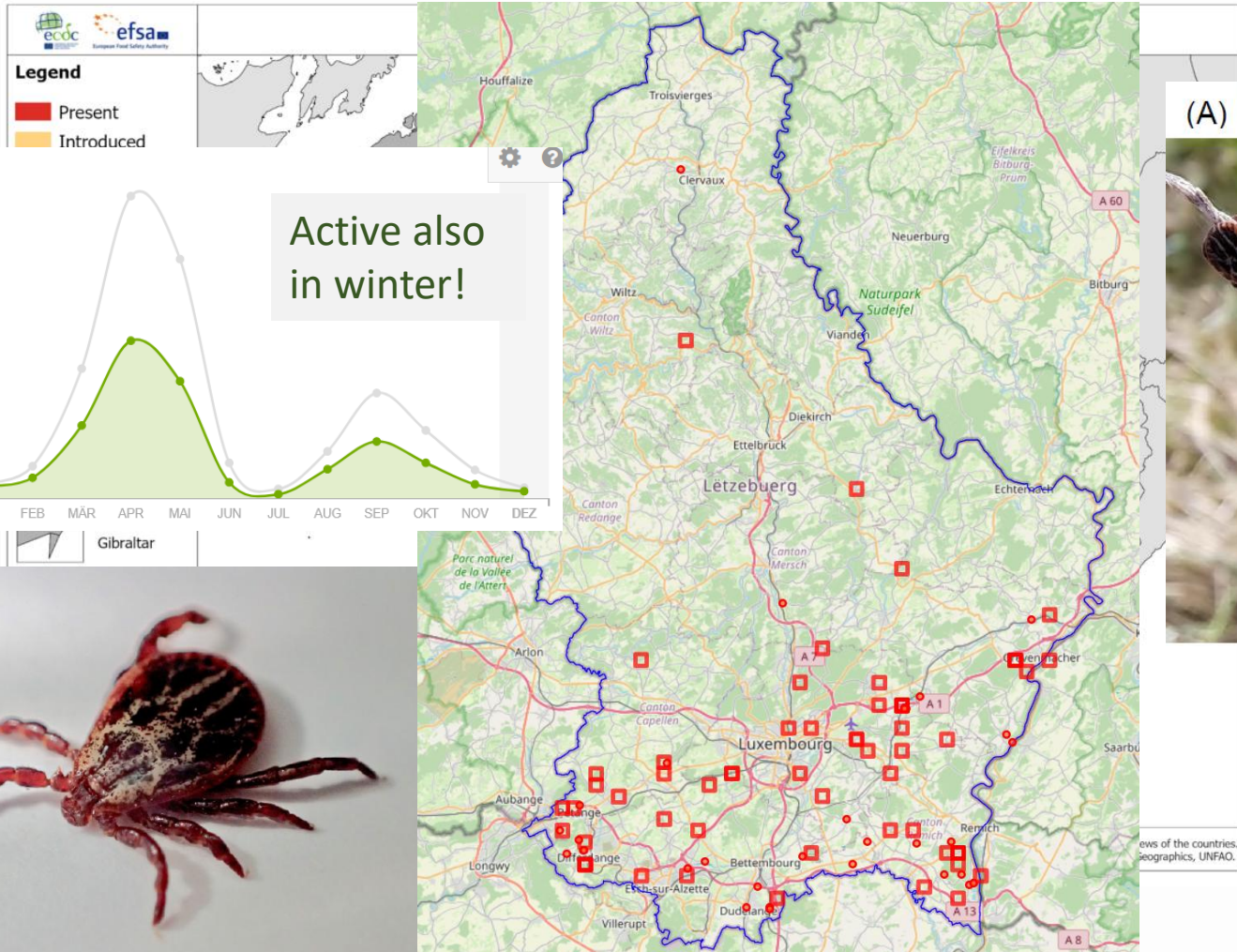


Dermacentor reticulatus

Winter tick / Marsh tick

LU data

- First record already in **2008**
- Ongoing expansion in Europe and LU



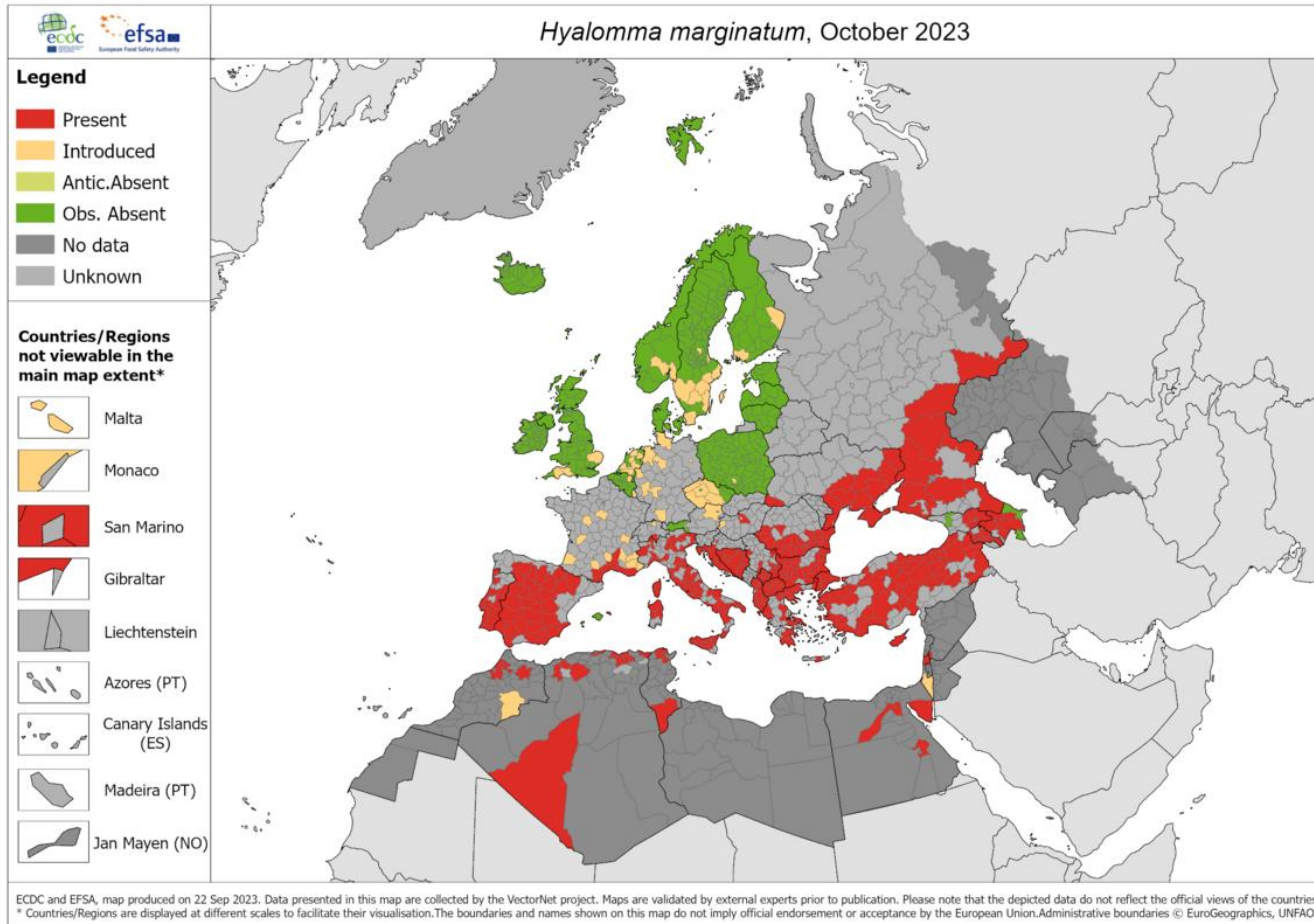
Vector potential
Babesia canis
Francisella tularensis
Coxiella burnetti
Theileria equi
Rickettsia spp.



Hyalomma marginatum

LU data

- First record **2018-08-31**, Dudelange
- 2020-06-14: Beaufort
- (2020-07-06: Aspelt)
- 2022-08-22: Goesdorf



Vector potential
CCHF virus
Rickettsia aeschlimannii



Hyalomma nymphs

First record of
Hy. rufipes in June 2024

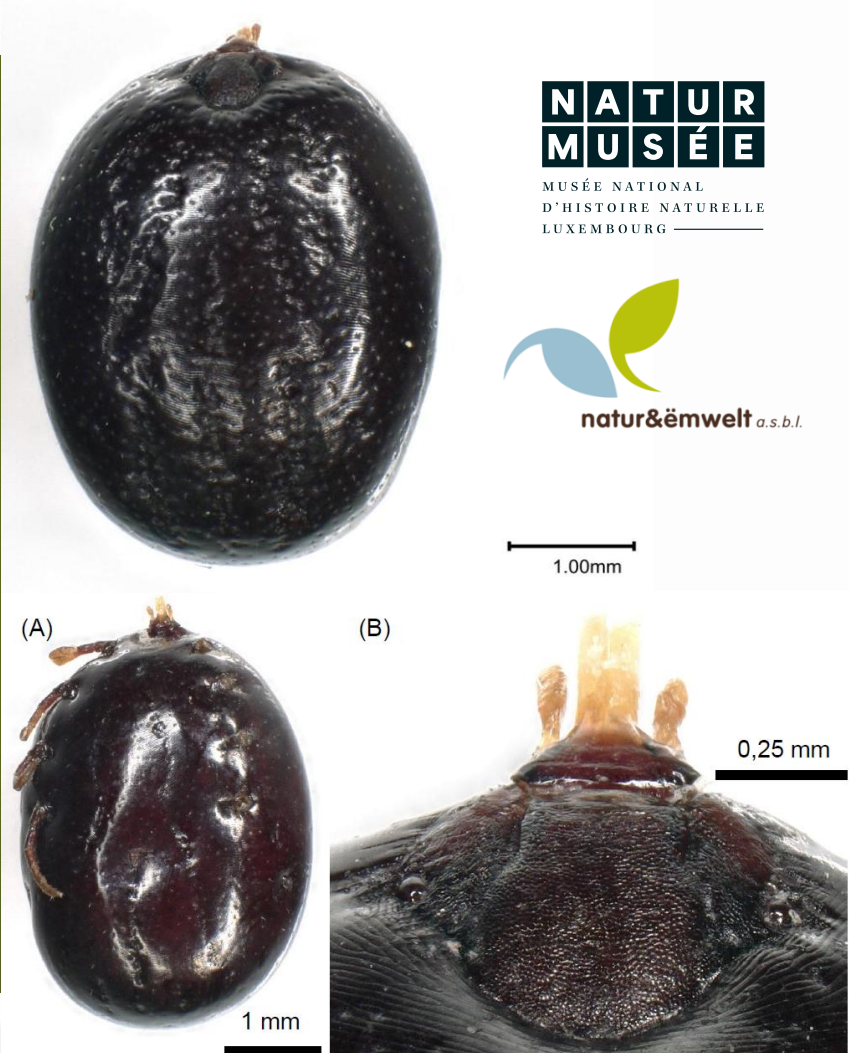
Hyalomma nymphs on
Acrocephalus warblers

Ac. schoenobaenus
Ac. scirpaceus
Ac. palustris



LU data

- First record **2018-08-31**, Dudelange
- 2020-06-14: Beaufort
- (2020-07-06: Aspelt)
- 2022-08-22: Goesdorf
- **2023-04: Schlammwiss**



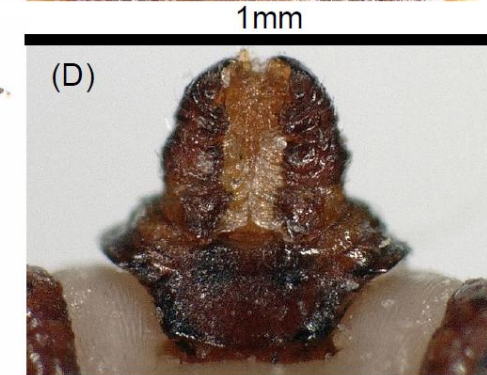
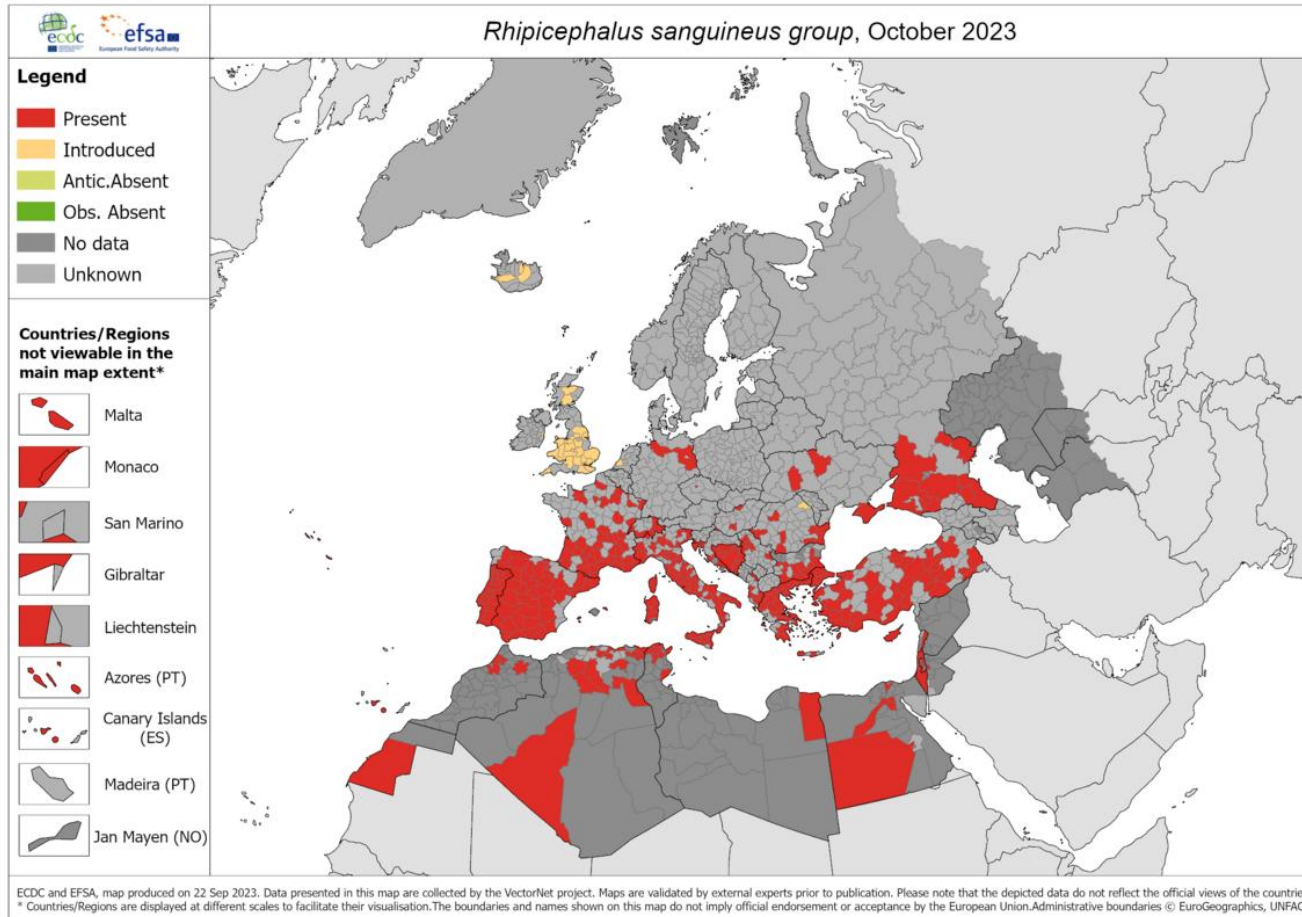


Rhipicephalus sanguineus (s.l.)

Brown dog tick

LU data

- First record **2024-04-25**



Vector potential

Ehrlichia canis

Rickettsia spp.

1 case, on human.

Family with dog
and travel history.

Rickettsia massiliae



Sand flies

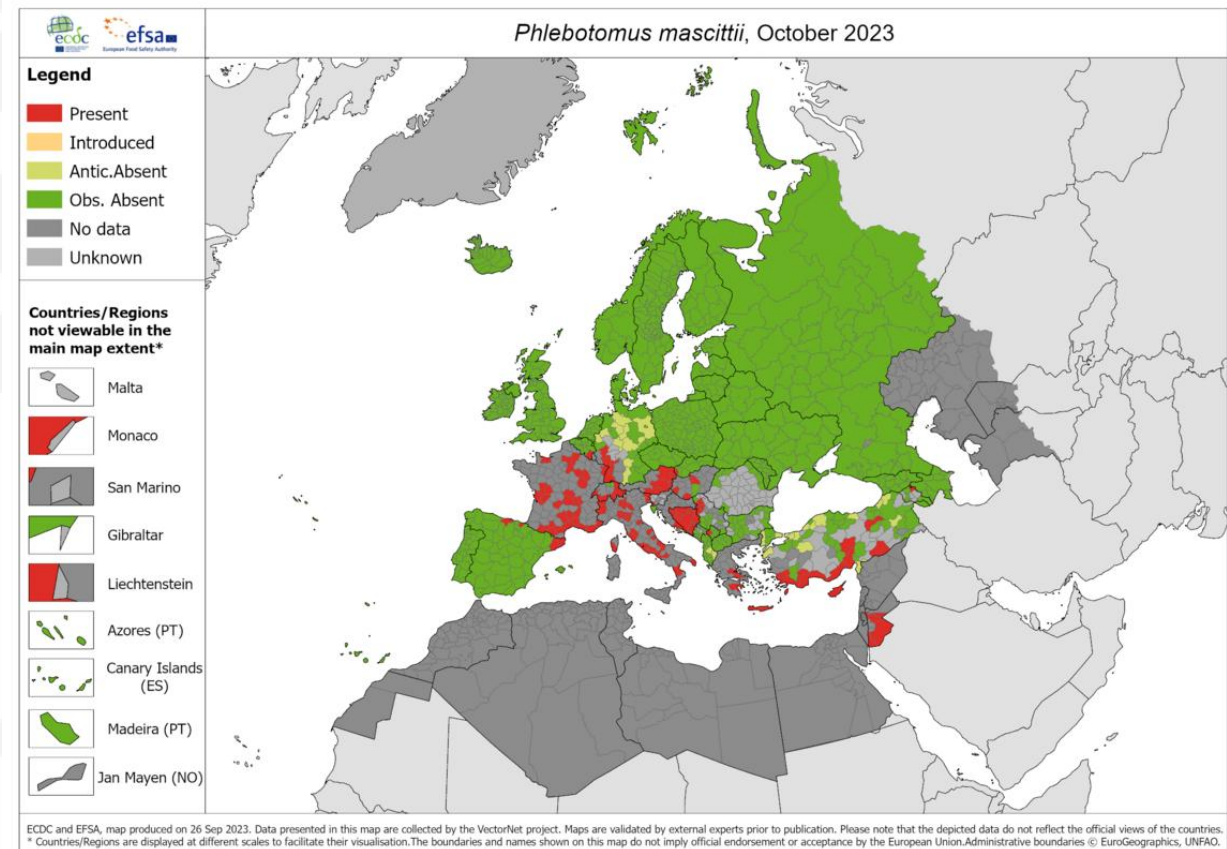
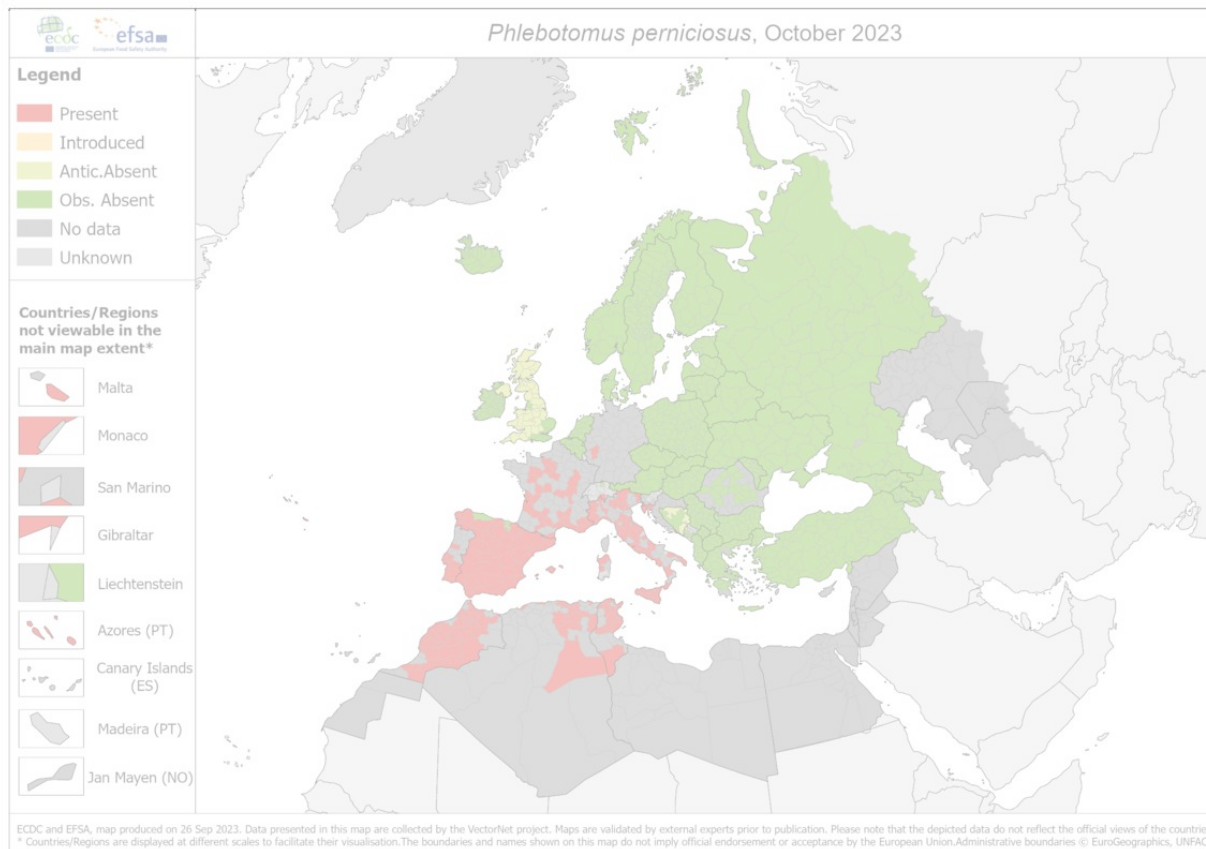
1/10 priority species present in LU

Vector potential

Leishmania infantum
(Leishmaniasis)

LU data

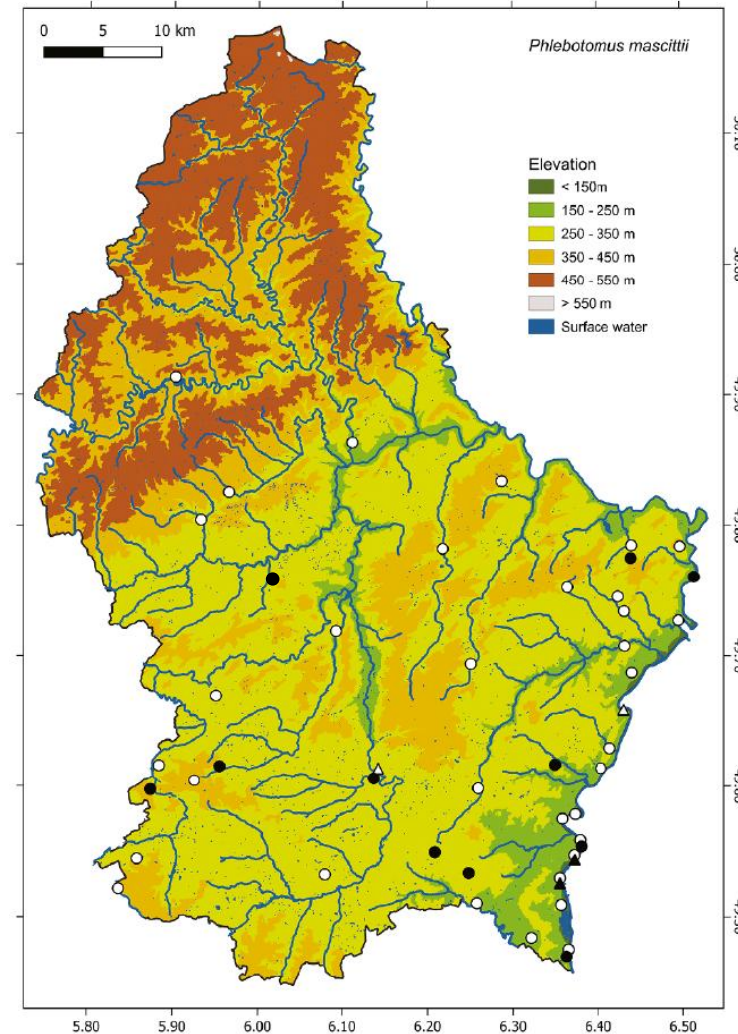
- First record **2023-07-12** of *Ph. mascittii*
- 2 sites (Remich, Bech-Kleinmacher)



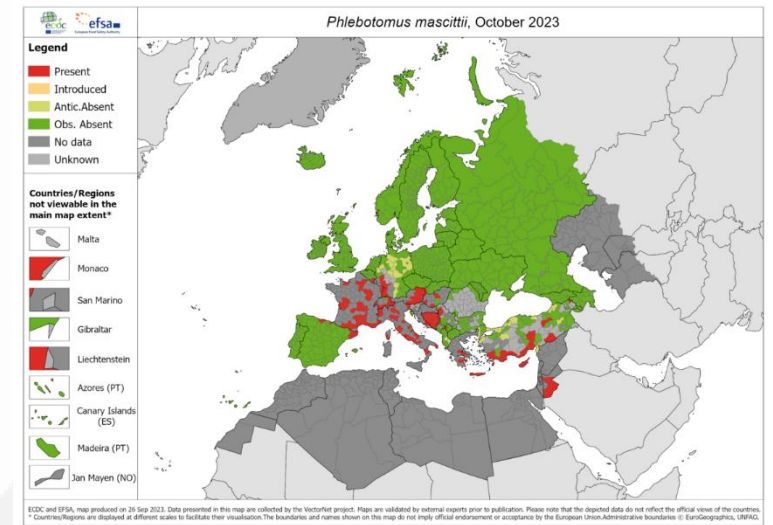


Sand flies

- VectorNet training course **2023**
- Expanded targeted study **2024**
- By-catch finding **2025**



● 13 presence sites; 2023-2025



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JOURNAL OF THE EUROPEAN MOSQUITO CONTROL ASSOCIATION
(2025) 1–11

BRILL
WAGeningen
ACADEMIC

RESEARCH ARTICLE

Phlebotomine sand flies (Diptera: Psychodidae: Phlebotominae) found
widespread but at low densities in Luxembourg

F. Schaffner^{1*} and A. Weigand²

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SPECIAL ISSUE: EMCA 2023 – SHAPING THE FUTURE OF VECTOR CONTROL IN EUROPE

RESEARCH ARTICLE

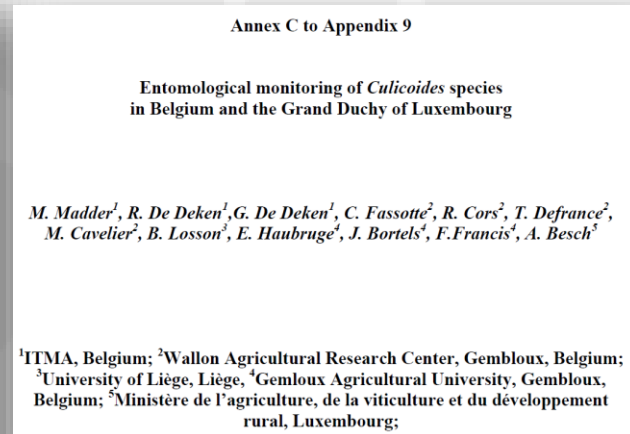
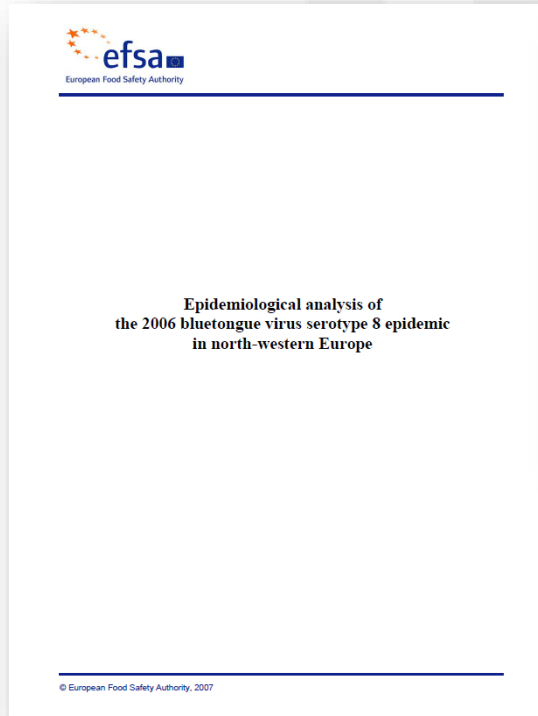
A survey of Phlebotomine sand flies across their northern distribution range
limit in Western Europe

J. Risueño¹, S. Bersihand², C. Bender³, T. Cornen³, K. De Boer⁴, A. Ibáñez-Justicia⁴, D. Rey², Y. Rozier²,
A. Schneider⁵, A. Stroo⁴, A. Vanslembrouck⁵, W. Van Bortel⁵, A. Weigand⁶, D. Zambianchi²,
P. Pérez Cutillas⁷, S. Oerther⁸, M. Braks⁹, G.R.W. Wint¹⁰, E. Berriatua^{1*} and F. Schaffner¹¹



Culicoides midges

- Historic survey data from **2006**



No *C. imicola*, indicating
BTV transmission by
indigenous species
(e.g. *C. dewulfi*, *C. obsoletus* s.l.)

Vector potential

Blue Tongue virus (BTV)

Schmallenberg virus

Epizootic hemorrhagic disease virus

bold = assessed by VectorNet

2006

species	n	sites
<i>C. obsoletus</i> complex	54	13
<i>C. dewulfi</i> (males)	2	2
<i>C. pulicaris</i>	17	8
<i>C. nubeculosis</i>	3	1
<i>C. punctatus</i>	2	2
<i>C. festivipennis</i>	1	1
<i>C. lupicaris</i>	1	1
<i>C. kibunensis</i>	1	1

Targeted field study in 2025 -> 8/10 species
(Francis Schaffner, Bruno Mathieu)

Summary

- All four vector groups present in LU



10/15



4/7



1/10

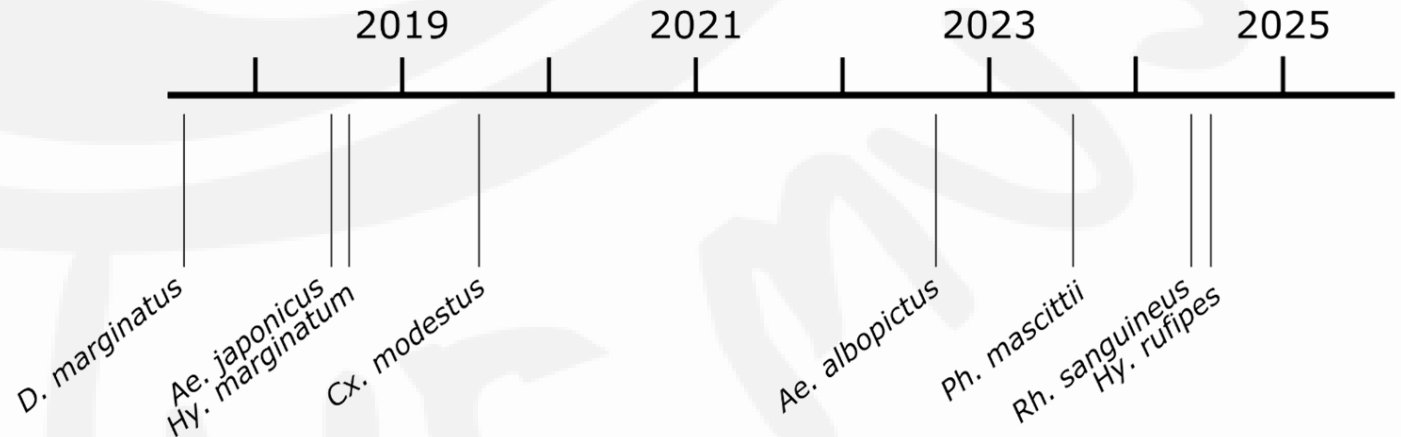


8/10

$\Sigma 23/42$

Presence / Total assessed species
by VectorNet

- Eight first records during recent years
ongoing spread of *D. reticulatus*



- ❑ Data **good** for mosquitoes and ticks; **opportunistic** for sandflies and biting midges
- ❑ **Integrated** and **multi-source data collection** effort

GBIF-hosted portal

Vectornetdata.org

- Ticks
- Mosquitoes
- Sand flies
- (Biting midges)

data collection for 2025 upload started

2,488 download events

Download report

901 OCCURRENCES FROM THIS DATASET

OCCURRENCE DATASET | REGISTERED FEBRUARY 12, 2025

VectorNet data Luxembourg 2023-2024

Published by National Museum of Natural History, Luxembourg

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901 OCCURRENCES

This dataset includes the 2023 and 2024 annual records of ticks, mosquitoes and sandflies from Luxembourg from a range of national institutions, fulfilling reporting requests from the ECDC and EFSA within the VectorNet project. Thereby, occurrence and/or specimen data originate from e.g. surveillance activities, habitat monitoring, veterinary services, hunters, bird ringing stations, community scientists, research projects, health services, etc. Additional data from the Greater Region can be sporadically included.

Publication date: February 20, 2025

Metadata last modified: February 20, 2025

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[How to cite](#) [DOI](#) 10.15468/fqrupf

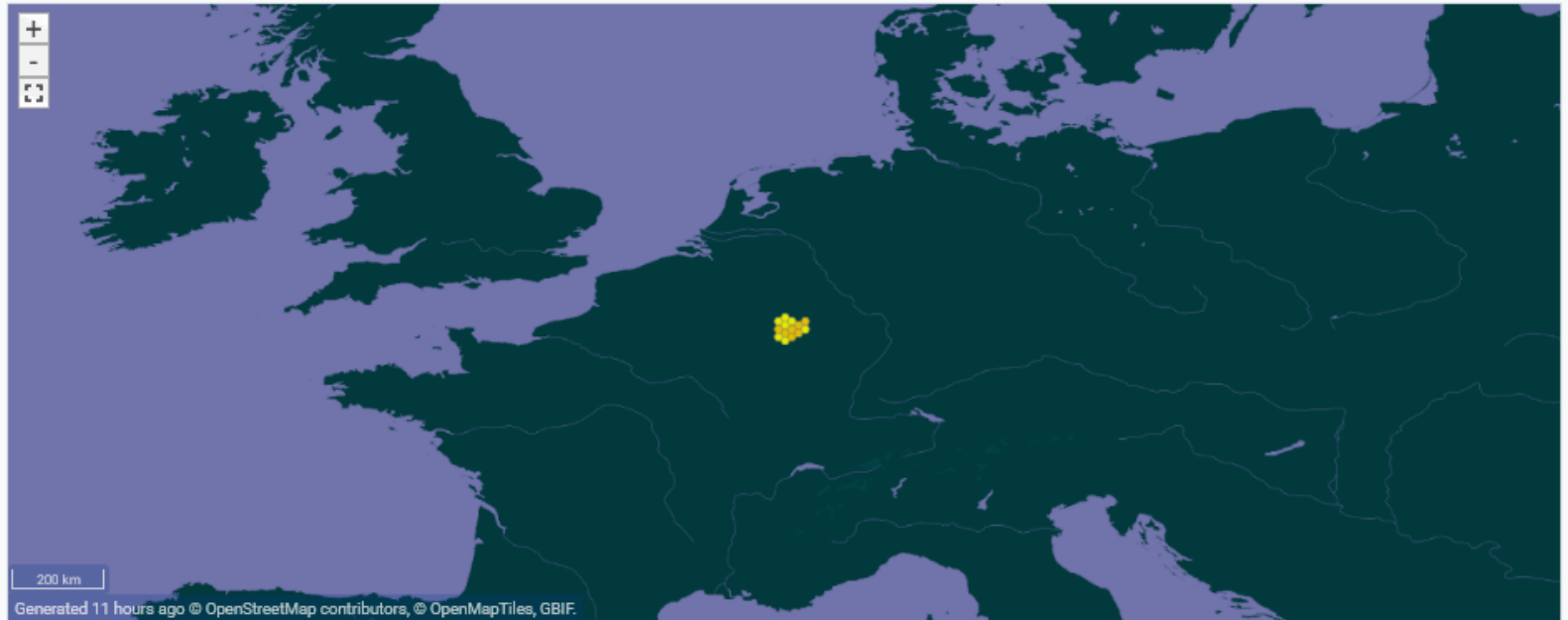
901
Occurrences

100%
With taxon match

100%
With coordinates

100%
With year

901 GEOREFERENCED RECORDS



Thank You for Your Attention!

Alexander Weigand

National Museum of Natural History Luxembourg
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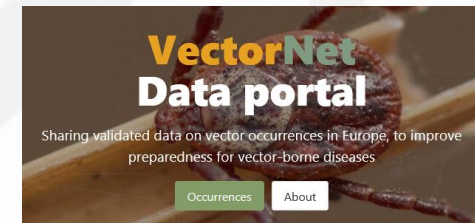
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Vectornetdata.org



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