

MediLabSecure (ENTOMO) – Newsletter n°34 – September 2022

SPECIAL ISSUE “MediLabSecure 3”



Dear network members,

This newsletter is a special edition to beginning the new MediLabSecure phase 3. We are very pleased to let you know about the new board for Medical Entomology. Florence Fournet is now the new key expert after Vincent Robert's retirement. Anaïs Portet started as the project manager. We wish all the best to Vincent Robert and Lauriane Mariamé in her new functions.

NEWS FROM THE MEDICAL ENTOMOLOGY SECTOR

In this third phase of MediLabSecure project, medical entomology objectives will remain the same, improve skills and knowledges about vectors to enhance national capacities of surveillance and control. During this phase, the One Health approach will be central, and medical entomology will be associated with all other sectors to dispense better trainings and support.

Main objectives will be to improve technical capacities to identify and localise vectors, adding an essential component, the insecticide resistance of *Aedes* vectors, as well as enhance awareness of the added value of integrated surveillance, improving, for example, the vector mapping tools for arbovirus.

To begin this new phase, we will organize two events before the end of 2022.

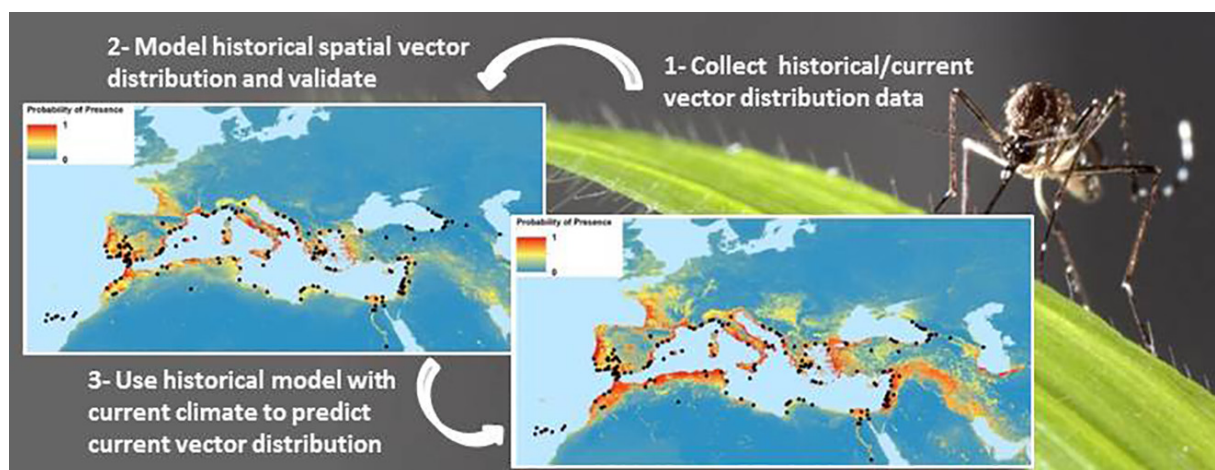
- A training on insecticide resistances in Montpellier (France) from 14th to 18th of November, dedicated to Euro-Mediterranean countries. During this week the aim is to acquire competencies and knowledges to test the *Aedes* mosquito's resistances to different types of insecticide. The workshop will be dispensed in small working groups to promote wet lab practical aspects.
- A webinar on raising public awareness, probably in December 2022. During this half-day, some of our partners will present their works and their actions on the importance of public awareness about vector-borne diseases. These presentations will be following by discussion to share experiences and improve this important aspect of our sciences.
- A training will be dispensed for the Sahel's countries in 2023. More information will be communicated in the following newsletters.

ENJOY READING

Finally, with this newsletter, we would like to share with you two interesting articles recently published which could feed our knowledges about vectors. The first one from a UK-Switzerland collaboration, while the second one is from several MediLabSecure fellows in Algeria.

[Past, present and future distribution of the yellow fever mosquito *Aedes aegypti*: The European paradox](#)

William Wint, Peter Jones, Moritz Kraemer, Neil Alexander, Francis Schaffner



Graphical abstract

In this article, the authors based the research on literature, museum collections and historical climate data sets to establish historical distribution presence, present and future of *Aedes aegypti* using spatial modelling techniques. All the available data can be used to successfully produce spatial models of *Ae. aegypti* distributions.

The mosquitos spread around tropical and sub-tropical areas during the 16th century and largely in Europe during the early 20th century. They almost disappeared in Europe by the 1960s, result of dedicated control campaigns or possible side effect of malaria vector control. The introduction of piped water in rural area could also contribute to the *Ae. aegypti* reduction.

Between 1960 and 2000, no significant established population appear in Europe. Since 2000, few sporadic establishments are reported in Madeira, southern Egypt, and the Caucasus, and more widely along the west Black sea's coast.

Despite the modelling prediction the vector has failed to re-establish in continental western and southern Europe, the authors discussed several hypotheses which could explain why.

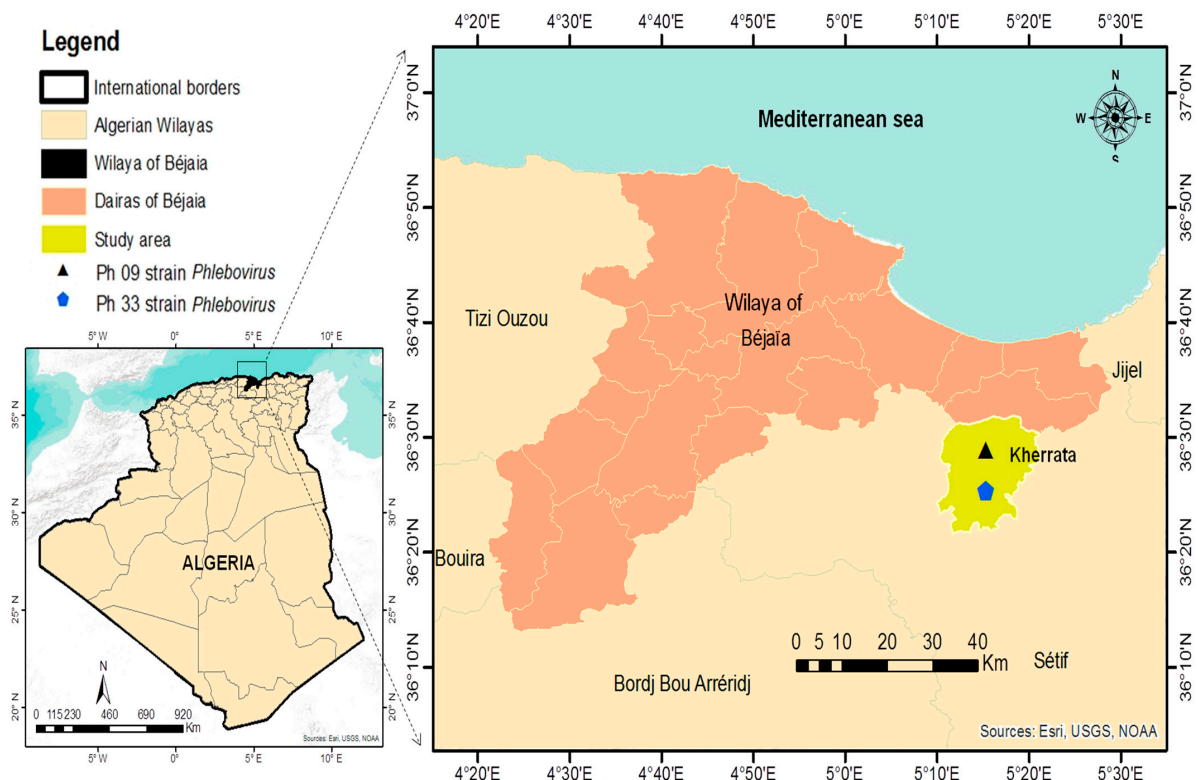
- Model overestimates suitability, which is unlikely.
- Reported points of entry are unsuitable (wrong time of the year for the establishment).
- The presence of, more or less, universal piped waters in Europe.
- Sufficient mosquito control, despite the establishment of other container-breeding invasive species.
- Interspecific competitions between *Ae. aegypti* and other mosquito species, like *Ae. albopictus* and maybe *Culex pipiens*.
- Not sufficient suitable breeding sites in Europe.
- Despite successfully introductions, *Ae. aegypti* cannot spread due to the winter temperatures in northern locations.
- Not enough importation of *Ae. aegypti* during the modern period for a successful establishment.

In parallel with the Europe predictions, the authors did the same using the USA's data. Despite large and coordinated mosquito eradication efforts in the Americas and the strong decline of *Ae. aegypti* in 19 countries of Central and South America by the 1960s, the USA observed today a large thrive of these mosquitos. The authors' hypotheses are the lack of control efforts or the different degrees of interactions with other vectors.

Finally, the authors conclude for now despite the suitable conditions *Ae. aegypti* are not re-established yet but with increasing global trades and warmer winters, this statement could change in the future.

First Isolation of Punique Virus from Sand Flies Collected in Northern Algeria

Hemza Manseur, Aissam Hachid, Ahmed Fayez Khardine, Kamal Eddine Benallal, Taha Bia, Merbouha Temani, Ahcene Hakem, Maria Paz Sánchez-Seco, Idir Bitam, Ana Vázquez and Ismail Lafri



Geographical location of the study area

In this article, the authors sampled sand flies from the Kherrata region, Northern Algeria. Sand flies were captured in human houses and animal shelters. The aim of this study is to investigate the circulation of phleboviruses among sand flies.

Several studies have shown, in the past decade, numerous phleboviruses transmitted by sand flies in Mediterranean countries and 24 sand fly species belonging *Phlebotomus* and *Sergentomyia* were recorded in Algeria. Despite the capacity to transmit a wide range of arthropod-borne viruses by sand flies, only one research was done regarding phleboviruses carried out in North Africa. Before this study, one TOSV (Toscana virus – classified in the Sand fly Fever Naples Virus (SFNV)) was isolated from Algerian sand flies.

In this study, male and female sampled sand flies were infected with Punique Virus (PUNV). The global infection rate was 0.06% which is less important compared with data reported in Tunisia (0.13%). Among these PUNV viruses, 2 strains were detected:

- Ph9 – ON524174 PUNV – closely related to the sequence AB905362.1 PUNV found in Tunisia

- Ph33 – ON524173 PUNV – closely related to the sequence MT250046.1 PUNV found in Algeria, Blida region

The Ph9 and Ph33 strains were detected in the same animal shelter.

All the sand flies captured in this study are from the subgenus *Larroussius*, 98.6% of them are *Ph. perniciosus* species which was expected because it's the main species identified in humid and sub-humid areas.

In Tunisia, Utique region, the human visceral leishmaniasis is principally transmitted by *Ph. perniciosus*, and because in this study the two strains of PUNV were isolated from sand flies coming from an area where visceral leishmaniasis is endemic, these raise the question of the possible co-circulation of *Leishmania infantum* and PUNV. Another co-circulation was observed in central Tunisia with TOSV and *Leishmania infantum*.

Despite the unknown about the impact of PUNV on public health, it's a member of the SFNV-group and among them, the majority are pathogenic for humans. Moreover, this virus is detected in sand fly vector of *Leishmania infantum* in Algeria. The authors reiterated the importance to conduct studies on the impact of this virus on public health.

Finally, the authors conclude for now no effective vaccine or treatment exist against human pathogenic phleboviruses and the only solution to protect against them is collective and individual control measures against sand flies. A serological investigation of patients and domestic animals will remain essential to understand the impact of this virus on public health.

If needed, we may help to get the full pdf of these articles.

If you have any suggestions or information you wish to share, please let us know and send an email to the discussion mls.entomo-all@listes.ird.fr

Best regards,

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& Florence FOURNET / Medical Entomology leader
MediLabSecure project

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