SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

This report is submitted for approval by the STSM applicant to the STSM coordinator

Action number: CA17108 - *Aedes* Invasive Mosquitoes

STSM title: "Modelling the spatio-temporal distribution of *Aedes albopictus* in Greece"
STSM start and end date: 19/09/2022 to 23/09/2022
Grantee name: Evangelia Zavitsanou

PURPOSE OF THE STSM:

Aedes albopictus, one of the most invasive species in the world, is a vector of viruses for dengue, chikungunya, yellow fever, Japanese encephalitis, and zoonoses, such as dirofilarioses (Giangaspero et al., 2013) presenting thus a notable threat to public health (Stefopoulou et al., 2018). Apart from vector of viruses *Ae. albopictus* causes serious nuisance to citizens. Lack of up to date and more precise *Aedes* distributional data and potential distributional modelling hampers effective vector surveillance and control (Ducheyne et al., 2018).

In the current Short Term Scientific Mission (STSM) the first objective was to become acquainted with R spatial modelling and VECMAP. The second objective was to update the existing presence/absence database of *Ae. albopictus* and also process and organize in spatial databases the existing mosquito population data from the Region of Attica. The overall objective of the accomplished STSM, was to get hands on training experience on modelling the spatial distribution of *Ae. albopictus* using statistical and modeling techniques such as Generalised Linear Modeling (GLM). For the application of the abovementioned techniques, VECMAP and R were used for spatial modelling and for the assessment of accuracy and uncertainty.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

The Short Term Scientific Mission was accomplished in Avia-GIS, in Zoersel, Belgium. The training included case studies using existing data from the Region of Attica, as collected through the entomological surveillance conducted the years 2021 and 2022 by Benaki Phytopathological Institute, in combination with freely available public data.

During the first three days (19-21/09/2022) focus was mainly on Rstudio and QGIS training. The particular training session started with the installation of the sofwares and the accomplishment of the tutorial exercises (QGIS and Rstudio tutorial exersices). The tutorial exercises, included the following:

- first contact with QGIS and exercises with examples.
- step-by-step process on how to construct a data base on accounting software and how we can edit our data base in Rstudio.
- Programming commands on Rstudio.

Furthermore, during the first days thorough discussions and training was made on the best way for using our data to create not only a map but also a successful model for presence and absence of *Aedes albpopictus*, during the standard entomological surveillance in the Region of Attica. Towards this end, a final data base has been created through Rstudio, which was in a manageable form for Vector, a very

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important process while modeling.

During the forth day (22/09/2022), training focused on adding and processing our data in Vector. By using our data, climatic Bio 1-19 characteristics, and different models we achieved to depict the presence and absence of female *Aedes albpopictus* in the region of Attica from 30/05/2022- 15/09/2022.

During the fifth and final day (23/09/2022), statistical documents that exported by Vector were explained as they are very important in whether a model is statistically correct or not. This process is very important for our research because it is needed to know if we can have a statistical correct model for *Aedes albopictus* in the Region of Attica.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

During my stay at AVIA-GIS, I believe that I have accomplished the main goal of my Short Scientific Mission, which was to use entomological data relative to the distribution of *Ae. albopictus* and expand my knowledge in the area of spatial distribution modelling and accuracy and uncertainty assessment. Moreover, the acquired knowledge through the Short Term Scientific Mission in Avia-GIS contributed to the capacity of myself and my group in the Benaki Phytopathological Institute on data analysis and geo-statistical modelling of *Aedes* species. Last but not least, my participation also contributed to the transfer of knowledge and promotion of data sharing between the COST Action partners.

During my STSM in AVIA-GIS, apart from the abovementioned training, I had the opportunity to build the presence/absence map of female *Aedes albopictus* for the Region of Attica from the data of entomological surveillance that accomplished in Benaki Phytopathological Institute, under the guidance of Cedric Marsboom, and that is what the bellow image presents.
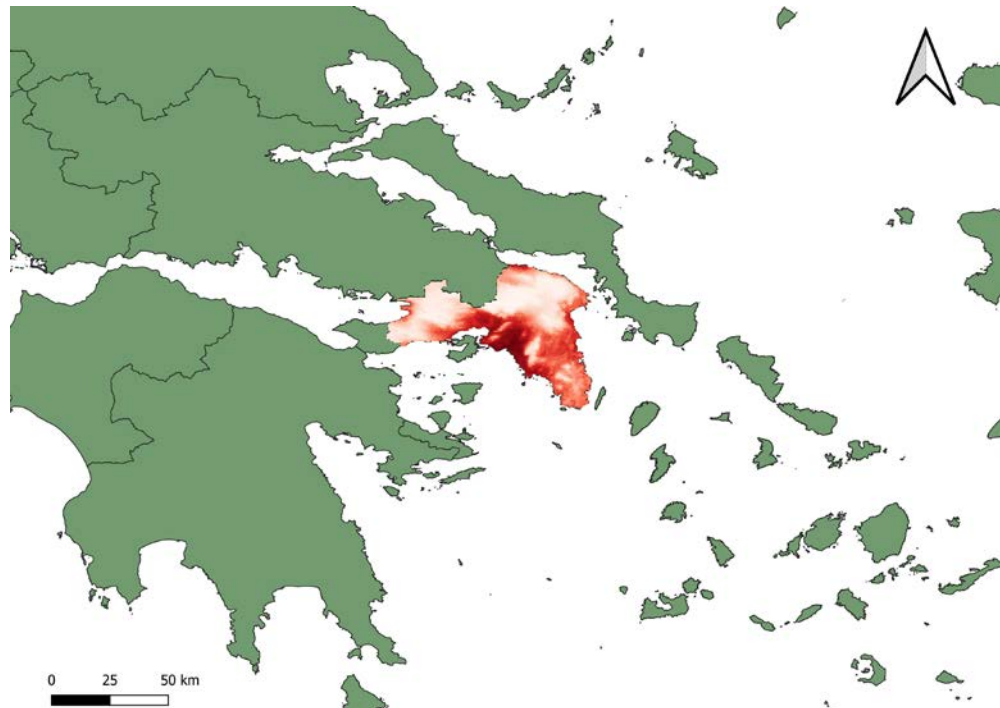
FUTURE COLLABORATIONS (if applicable)

I received an introductory training course on VECMAP and R for spatial analysis which will enable me to process the data from the entomological surveillance accomplished in the Benaki Phytopathological Institute. My collaboration with AVIA-GIS team will continue in terms of spatial analysis of Greek mosquito surveillance databases.

REFERECES

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Stefopoulou A, Balatsos G, Petraki A, LaDeau SL, Papachristos D, Michaelakis A (2018) Reducing *Aedes albopictus* breeding sites through education: A study in urban area. PLoS ONE 13 (11): e0202451. https://doi.org/10.1371/journal.pone.0202451

The STSM grantee
Zavitsanou Evangelia
Benaki Phytopathological Institute
Date: 27/09/2022   Signature:

Confirmation by the host institution of the successful execution of the STSM

I confirm that Angeliki Stefopoulou´s STSM, entitled "**Modelling the spatio-temporal distribution of *Aedes albopictus* in Greece**" has been organized at AVIA-GIS NV, Zoersel, Belgium within the activities of the WG1 AIM COST Action, from 2 to 6 March 2020, and it was concluded with success.
Angeliki Stefopoulou closely worked with myself and with the colleagues from AVIA-GIS NV**. All** of them greatly contributed to finalizing the activities planned and the success of the STSM.
As already pointed out, the STSM has been an opportunity for planning possible joint research activities and further successful collaboration under the umbrella of AIM COST Action.

For the Host Institution
Guy Hendrickx
Avia-GIS NV

Date: Signature: