

Medical Entomology & Biology of Disease Vectors 2017-2018

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The main objective of our lab is to study the biology and ecology of arthropod vectors (mosquitoes, sandflies, ticks, snails, etc.), as well as the transmission cycles of the viruses, parasites and other microbial pathogens they transmit. Furthermore, we are working on ways to mitigate vector borne disease transmission in Lao PDR via vector control training programs.



Executive summary

As previous years the Medical Entomology and Vector-Borne disease laboratory has been very active. This year we have

published five articles in reputable international journals. This year's report annual finalizes our results on the ECOMORE (Agence Française du Développement – AFD funded) and provides fresh results concerning the Yersin Project (Michelin Corporate Foundation funded). Both of these projects are dealing with vectors in rubber plantations and the assessment of vector borne disease risks concerning rubber workers and people entering the plantations, as well as methods to reduce mosquito vector populations in the plantations and how to best mitigate disease transmission. The Yersin Project carried out in Lao PDR and the Cote d'Ivoire is an excellent example of South-South cooperation within the Institut Pasteur International Network. The Yersin project was also highlighted during a radio program on Radio France International and also during a presentation at the Institut Pasteur International Network Directors' Meeting in Abidjan Cote d'Ivoire in September 2017. We also provide in this years report the final data of the MALVEC Project (French Ministry of Foreign Affairs funded) analyzing insecticide resistance in malaria vectors in 10 provinces in Lao PDR. This project has generated so far two publications.

In addition, we continued our collaboration with the US Naval Medical Research Center Asia (NMRC-A) in Singapore on a variety of subjects ranging from insecticide resistance in *Aedes aegypti* and *Aedes albopictus* vectors from several regions of Lao PDR (ArboVec and ArboVec Plus), to studies on ticks and tick borne pathogens (Tick Map 2). These results are now in and will be published shortly. Once again, we are showing that many of the ticks collected are harboring *Rickettsia* spp. pathogens and other bacterial pathogens underling the public health risks of villagers, workers, and tourists entering mountainous areas of Lao PDR where these ticks are prevalent. We have also reported several tick species previously unknown to Laos and even two new tick species, yet to be named. The Tick Map 2 project shows that the collaboration with LOWMRU at Mahosot hospital has been

extremely fruitful and exemplifies the collaborative spirit among researchers in Lao PDR. We also expose some preliminary results on BatMap where collaboration between IP Laos and the Lao National University Chiropteran (Bat) laboratory allowed surveying several caves where bat populations are prevalent. We have identified the Bat species and are now investigating the ectoparasites and putative bat-borne pathogens. Finally a new project supported by AFD called ECOMORE 2 will also examine the geospatial relationship between Aedes vectors and Dengue disease incidence.

Team:

Scientists:

1. Khamsing VONGPHAILOTH, MD
2. Sébastien MARCOMBE, PhD
3. Julie Anne TANGENA, PhD
4. Maysa MOTOKI, PhD

Junior Scientists:

1. Phoutmany THAMMAVONG, MD

PhD Students:

1. Elliott MIOT, MSc

Technicians:

1. Boutsady SOMPHONG
2. Somsanit CHONEPHESARATH
3. Nothasine PHOMMAVANH
4. Kaithong LAKEOMANY
5. Somphat NILAXAY
6. Phonesavanh LUANGAMATH
7. Nampherng XAYYAVONG

Project carried on in the lab:

- + Evaluation of Insecticide Resistance in Malaria Vectors in the Lao PDR and Thailand (MALVEC)
- + Economic development, ecosystem modifications, and emerging

infectious diseases risk evaluation project (ECOMORE I)
+ ECONomic Development, ECOSystem Modifications, and Emerging Infectious Diseases Risk Evaluation (ECOMORE II). Entomology work package.
+ Mosquito-borne diseases in rubber plantations: from Lao PDR to Côte d'Ivoire (Yersin project)
+ Vector mapping, characterization of insecticide resistance of Aedes populations, and entomology capacity development in the Lao PDR (ARBOVEC)
+ ARBOVEC-PLUS
+ Deployment of an integrated vector-biology and pathogen discovery platform in the Lao PDR (BioLao2)
+ Tick vector mapping and pathogen characterization study in Laos 2 (Tick Map 2 Project)
+ Assessment of the potential vector threat of bat-borne pathogens and the host-associated ectoparasites in the provinces of Vientiane and Khammouane of the Lao PDR (Bat Map Project)