

YERSIN PROJECT NEWSLETTER 4



In the fourth trimester of this project, fieldwork in Côte d'Ivoire has successfully been continued and preparations were made for fieldwork in Lao PDR. Since last December the Ivorian team has been collecting adult mosquitoes in the field for three consecutive weeks every month. Collected mosquitoes are currently being identified to species, so that important disease transmitting mosquitoes can be recognized. In Lao PDR the fieldwork protocol has been submitted to the Lao ethics committee for approval. We hope to start fieldwork in Lao PDR by June 2016.

Roadmap Yersin project

	Y 1				Y2				Y3			
Protocol writing	CI	CI		L	L	CI						
Renovation		CI										
Purchasing equipment		CI	CI		L							
Sensitization population			CI		L	CI						
Fieldwork adult collection			CI	CI	CI	CI/L	L					
Fieldwork larval collection							CI	CI	CI	CI		
Analysis						CI	CI	CI/L	L	CI/L	CI	CI
Communication to stakeholders							CI/L	CI/L			CI/L	CI/L



to be conducted



In process



Completed

CI: Côte d'Ivoire
L: Lao PDR

Fieldwork in Lao PDR

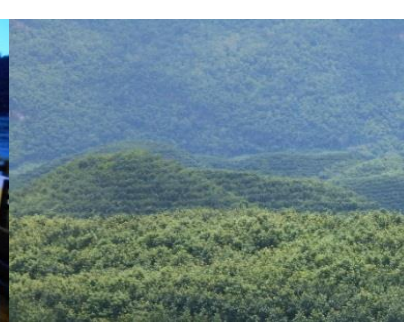
In Lao PDR we will assess different, already commercially available, vector control methods to protect rubber workers from mosquito bites. In Lao PDR there are three common ways in which people protect themselves against outdoor biting mosquitoes. Firstly, clothing covering the arms and legs are often used as a preventative measure against mosquito bites. Although to our knowledge no scientific study has been done on the protectiveness of long-sleeved clothing, important organizations like the World Health Organization (WHO) and Center for Disease Control and Prevention (CDC) advise wearing long-sleeved clothing to protect from mosquito bites. Secondly topical repellents, like DEET, are often used on the exposed skin to repel mosquitoes. Another example of a repellent is para-menthane-3,8-diol (PMD) that has been isolated from lemon eucalyptus leaves. We consider PMD to be equally effective as DEET with the additional benefit of its lower toxicity. Thirdly, workers burn mosquito coils with pyrethroid insecticides, which they hang from their trouser using a metal casing. Currently no permethrin-treated clothing is used in Lao PDR by the local population. This is a protection method popular with tourists and military travelling to the tropics. In our Lao study we will compare the three commonly used outdoor protection methods (long-sleeved clothing, PMD, coils) with permethrin treated clothing to identify which method protects people sufficiently from mosquito bites when outdoors, and we will conduct a social study to understand the acceptance of the different methods by the local Lao population.

Activities of the 4th trimester

- ✓ Continue fieldwork in Côte d'Ivoire
- ✓ Write protocol for fieldwork in Lao PDR
- ✓ Apply for ethical approval fieldwork Lao PDR

Activities 5th trimester

- ☐ Continue fieldwork in Côte d'Ivoire
- ☐ Start fieldwork in Lao PDR



Introducing our Team

Issouf Traore

Institut Pasteur de Côte d'Ivoire
MSc student

Expertise: environmental engineer



I arrived at the Entomology Unit of Institut Pasteur de Côte d'Ivoire one year ago where I was first exposed to entomology and its importance in the control of vector-borne diseases. It has awakened my passion for entomology and has motivated me to enroll in a Scientific Master II on medical and veterinary entomology. The Yersin project is a great opportunity for me to do research for my masters program and to exchange knowledge and expertise with the team from Laos. In addition, this project provides me with great field experience to understand the behavior of mosquitoes and to propose solutions for the problems they cause to rubber plantation workers. I would like to thank the Michelin Corporate Foundation for kindly supporting us in this project of great scientific and social significance.

Lao PDR-geography and economy

Lao People's Democratic Republic is a low-middle income country landlocked by Myanmar, China, Vietnam, Cambodia and Thailand. Lao PDR is a country roughly the size of the United Kingdom with a total area of 236,800 km². The Mekong River is the largest and most important river in the country, spanning over 1898 km within the country. Lao PDR is exceptionally diverse in its ethnicities. In 2014 Lao PDR consisted of 6.7 million inhabitants with more than 57 recognized ethnic groups. The population density is very low compared to neighbouring countries with 24 people/km² compared to Thailand with 127 people/km². Since the economic reforms in the late 80's Lao PDR has become one of the fastest growing economies in Asia with Gross Domestic Product (GDP) in 2014 growing 7.5%. More than half of the country's wealth is comprised of natural resources, including timber and minerals.

Rubber plantations in Lao PDR

Asia is currently consuming the largest proportion of natural rubber with Asian rubber plantations mainly found in Thailand, Indonesia and Malaysia, together accounting for an estimated 72% of natural rubber production. The Lao government has encouraged farmers to grow rubber trees in recent years, as rubber plantations are seen as a potential sustainable alternative for poor farmers. According to the National Agriculture and Forestry Research Institute (NAFRI) of Lao PDR in 2006 profit for rubber plantation area was 880 USD/ha compared to 146 USD for rice and 903 USD for opium.

Lao PDR has seen a rapid increase in rubber plantation area, with 900 ha of mature plantations in 2010 increasing 163 fold to 147,000 ha in 2015. According to NAFRI, this rubber plantation area is likely to expand to 342,400 ha in the future.

The government is worried about diseases linked to this increase and has asked Institut Pasteur du Laos to investigate the consequences.

In Newsletter 5 geography, economy and rubber plantations in Côte d'Ivoire will be described.

Fieldwork in Côte d'Ivoire

Fieldwork in Côte d'Ivoire was commenced in December 2015 and will be conducted monthly until November 2016. During the first three months of collection (December, January, February) a total of 2,022 mosquitoes were collected.

The adult mosquitoes collected were identified to 42 different species. Arboviral vectors, including vectors of dengue and yellow fever, have been found in the different habitats:

- *Aedes aegypti*
- *Aedes africanus*
- *Aedes luteocephalus*
- *Aedes metalicus*
- *Aedes opok*

Furthermore the malaria vector *Anopheles gambiae s.l.* has been identified.

Adult mosquito surveys will continue until November 2016, after which the different habitats (rubber plantations and villages) will be compared for vector exposure risk.