MediLabSecure (WP3) – Newsletter n°26 – March 2021

SPECIAL ISSUE "The *Anopheles stephensi* risk"

Dear network members,

This newsletter is a special edition dedicated to the expansion of the originally Asian mosquito *Anopheles stephensi*. The spread and evolution of this mosquito is now becoming alarming and could soon trigger mass outbreaks of malaria among urban populations previously free from malaria.

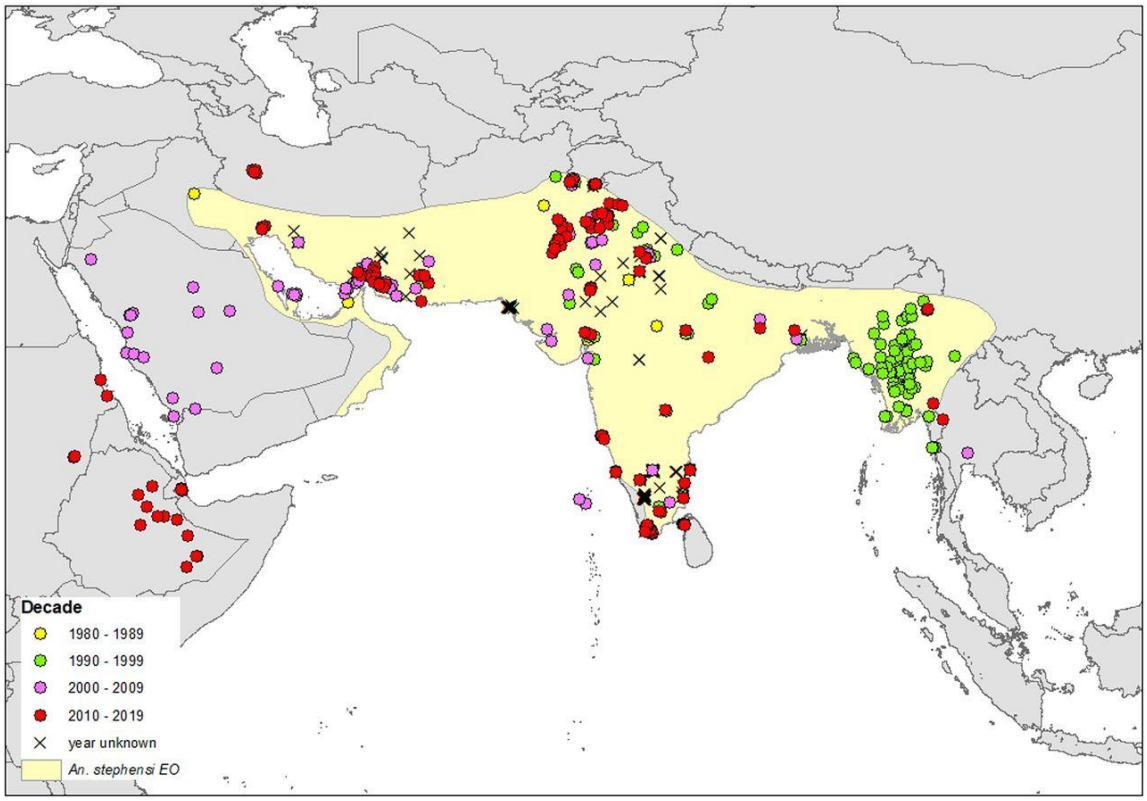

Image from PNAS article[1]

[1] A new malaria vector in Africa: Predicting the expansion range of *Anopheles stephensi* and identifying the urban populations at risk M E Sinka, S Pironon, N C Massey, J Longbottom, J Hemingway, C L Moyes, K J Willis

The situation is all the more tricky as *An. stephensi,* a mosquito tolerant to urban environment, is particularly sensitive to both *Plasmodium falciparum* and *Plasmodium vivax*, making them equally or even more effective than already well-known and fought African, Arabic and Indian mosquito vector species. Besides, they are more tolerant to pollution, resist relatively higher temperatures and commonly used classes of insecticides better than other mosquitoes. In addition to this, their biting behaviour is very different from the main other mosquito vectors, which bite mainly indoor late in the night, while *An. stephensi* bites mainly outdoor and in the evening. Thus, most of the vector reduction techniques mainly based on the use of mosquito nets soaked in residual insecticides at night is less effective against *An. stephensi*.

REFERENCES TO GRASP THE SITUATION:

Anopheles stephensi mosquitoes as vectors of *Plasmodium vivax* and *Plasmodium falciparum*, Horn of Africa, 2019
Fitsum G. Tadesse, Temesgen Ashine, Hiwot Teka, Endashaw Esayas, Louisa A. Messenger al al.

This study mainly focuses on a comparison between the different haplotypes of *An. stephensi* and other mosquitoes from Ethiopia. It unfortunately confirms that for both *Plasmodium falciparum* and *Plasmodium vivax*, *An. stephensi* is even more susceptible to be infected than other anopheles mosquitoes. The genetic analysis also shows that among *An. stephensi* mosquitoes heterogeneity arises in the shape of four haplotypes. This differentiation could already show different evolutions among the group that settled in Ethiopia or suggest that they have successively been imported via the main transportation corridor from Djibouti.

A new malaria vector in Africa: Predicting the expansion range of *Anopheles stephensi* and identifying the urban populations at risk
M E Sinka, S Pironon, N C Massey, J Longbottom, J Hemingway, C L Moyes, K J Willis

Based on a very comprehensive model analysing the ecology of *An. stephensi*, this article is a vibrant warning precisely forecasting the next steps of the incursion of *An. stephensi*. It pictures its already advance adaptation to urban areas and its biting behavioural differences with other malaria vector species. The result of this robust extrapolation effort is terrifying: 126 million people more, mainly in urban areas could be at risk of being contaminated if the expansion continues and fighting measures are not implemented very soon and massively. Out of 68 African cities with more than 1 million inhabitants, 44 cities would be highly suitable for *An. stephensi*, such as Niamey, Ouagadougou, Bamako and Dakar in West Africa, Tripoli and Cairo in North Africa, Agadir in Morocco, Beyrouth and Aman in the Middle East, and Antalya and Mersin in Turkey.

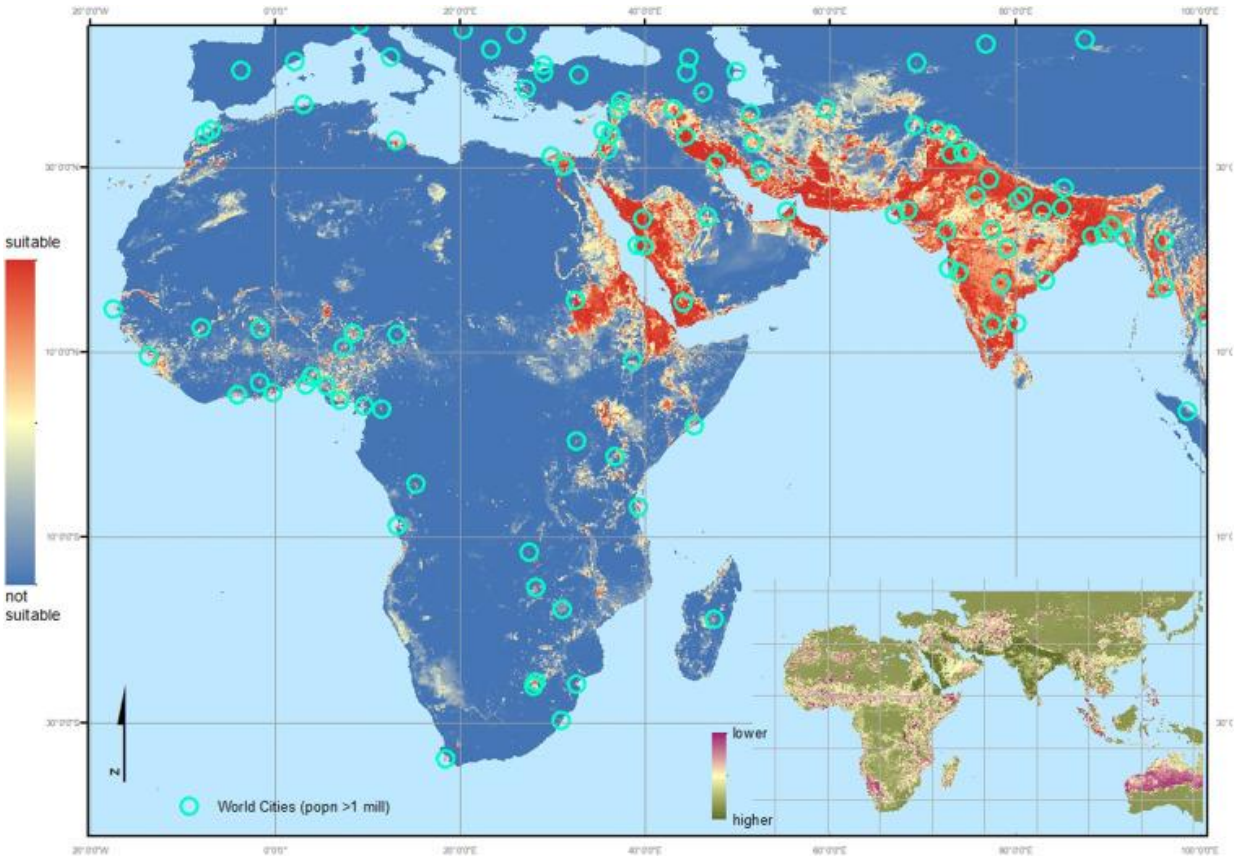

Image from PNAS article[2]

Vector alert: *Anopheles stephensi* invasion and spread
WHO Global Malaria Programme, Vector Control and Resistance

This vector alert published by the World Health Organisation acknowledges the spread of *An. stephensi* to be a major potential threat to malaria control and elimination in Africa and southern Asia. The goal of this document is to urge WHO Member States and their implementing partners – especially those in and around the Horn of Africa, the Republic of the Sudan and surrounding geographical areas, and in Sri Lanka – to take immediate action.

[2] A new malaria vector in Africa: Predicting the expansion range of *Anopheles stephensi* and identifying the urban populations at risk. M E Sinka, S Pironon, N C Massey, J Longbottom, J Hemingway, C L Moyes, K J Willis

HOW TO IDENTIFY AN. STEPHENSI SPECIMEN

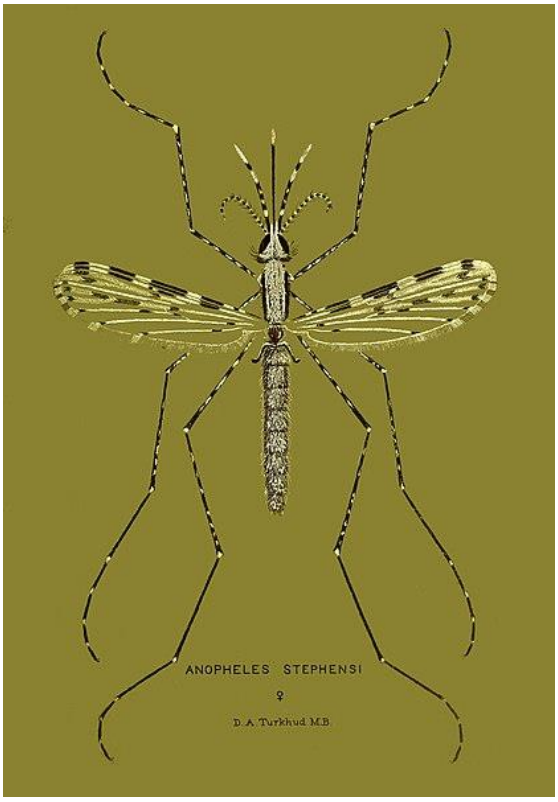

Image from Wikipedia Commons[3]

The main distinctive characteristic is the sequence of four black spots along the front part of the wings. In addition, the legs are speckled and palps of the female mosquitoes presents four pale bands, the two apical bands very large.

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

Best regards,

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All the previous entomo newsletters are available on the MediLabSecure website.

[3] https://commons.wikimedia.org/wiki/File:Anopheles_stephensi_Turkhud.jpg