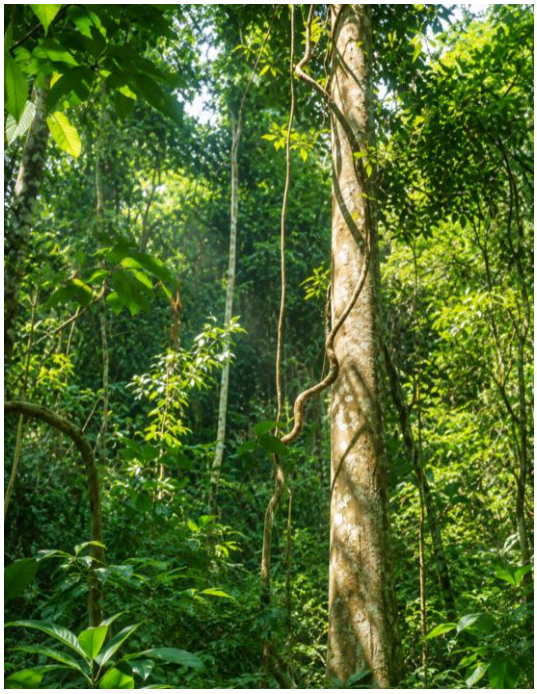
PANDASIA PREVENTING FUTURE PANDEMICS
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Looking Beyond Homes: New PANDASIA Research Identifies Mosquito Hotspots at Human–Animal Interfaces in Thailand

Understanding where people, animals and mosquito vectors interact is essential to anticipating and preventing future disease outbreaks.



A new scientific publication from the PANDASIA research team, published in *Parasites & Vectors*, provides important evidence on the distribution and abundance of mosquito species associated with arboviral transmission in rural areas of Thailand. The study, titled **"Mosquito arboviral vectors at zoonotic interfaces in border provinces in Thailand,"** examines mosquito populations across seven different environments where human activities and animal habitats intersect: homes, temples, dumpsites, orchards, forest edges, forest interiors and bat caves. Conducted during the dry and wet seasons of 2024 in selected districts of Chanthaburi and Chiang Rai provinces, the research offers an updated understanding of mosquito ecology in environments that are often overlooked in conventional disease surveillance.

The findings highlight the importance of the following actions:

- Expand vector surveillance beyond households to include rural and human–animal interfaces.
- Strengthen monitoring across different seasons to better understand mosquito population dynamics.
- Integrate environmental management, waste management and vector control approaches.
- Improve awareness and protective practices among people working in or living near potential exposure sites.
- Further investigate the role of mosquito species such as *Aedes albopictus* as potential bridge vectors between wildlife and human environments.

What did the study find?

The researchers collected and identified 14,108 mosquitoes representing nine genera and 51 species, revealing important differences in mosquito abundance and composition across the seven interfaces. One of the most striking findings was that dumpsites had the highest abundance of arboviral mosquito vectors among the environments examined. Two species, *Culex gelidus* and *Culex vishnui*, were particularly abundant at these sites. Both are known vectors of Japanese encephalitis virus (JEV) and Tembusu virus (TMUV). Meanwhile, *Aedes albopictus*, a known vector of dengue and chikungunya viruses, was found across all seven types of interfaces, with particularly high abundance in forest interiors. The study also found higher mosquito abundance during the wet season, highlighting the importance of seasonal patterns in understanding vector populations and potential exposure risks. These findings draw attention to environments beyond residential areas, including waste disposal sites, agricultural landscapes and forest margins, where people and animals may encounter mosquito vectors.



Homes



Forest edge



Temple



Dumpsite



Orchard



Bat cave

Why does this matter for One Health and pandemic preparedness?

The findings reinforce an important One Health perspective: disease emergence cannot be understood by looking at human health in isolation. Dumpsites, for example, can attract people, domestic animals, wildlife and rodents, creating opportunities for interactions among different species. Mosquitoes in these environments may contribute to pathways through which viruses circulate between animal hosts and humans. For communities living and working near these environments, understanding potential exposure is an important step towards strengthening prevention and preparedness.

Contributing to PANDASIA's vision of preventing future pandemics

This publication contributes to PANDASIA's broader efforts to understand zoonotic spillover risks at the frontline of disease emergence in Southeast Asia. By generating evidence on mosquito ecology across different human–animal–environment interfaces, the research helps identify where surveillance and preventive interventions may be most needed. It also demonstrates why pandemic preparedness requires more than responding to outbreaks after they occur. It calls for proactive surveillance, interdisciplinary research, environmental awareness and stronger collaboration among researchers, public health authorities and local communities. Importantly, the researchers recommend longitudinal monitoring to better understand mosquito populations and pathogen dynamics throughout the year. The presence of mosquito vectors indicates potential exposure pathways but does not in itself confirm that the mosquitoes sampled were carrying viruses.

About the publication

Title: Mosquito arboviral vectors at zoonotic interfaces in border provinces in Thailand

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