A study of the relationship between weather conditions and mosquito larvae density in Phak Mai Subdistrict, Huai Thap Than District, Si Sa Ket Province

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Abstract

This research investigated the prevalence of Aedes mosquito larvae and its correlation with climatic factors in Phak Mai Subdistrict, Sisaket Province. Surveys conducted from June to August 2025 in Ban Du, Ban Phrai Phanaow, and Ban Ta Thong analyzed larval abundance using House Index (HI) and Breteau Index (BI) alongside rainfall, humidity, and temperature data. The results indicated a high risk of dengue transmission, with HI consistently exceeding 10, particularly during periods of heavy rainfall and high humidity. However, villages implementing proper water container management demonstrated significantly lower larval indices. These findings confirm that while climatic variations drive dengue risk, effective community-based environmental management is essential for prevention and control.

Introduction

The Climate Factor: Rainfall, humidity, and temperature are key drivers of Aedes mosquito populations. Rain creates breeding sites (stagnant water), humidity helps adults survive, and temperature speeds up larval growth.

The Problem: Phak Mai Subdistrict has a monsoon climate and residents often store water, creating high risk for Dengue. However, there is a lack of specific local data connecting these weather patterns to mosquito larvae levels.

The Objective: This study aims to analyze the relationship between local climatic factors and mosquito larval density (measured by HI and BI indices).

The Goal: The findings will provide a factual basis for creating more effective, sustainable community plans to monitor and control Dengue fever, especially as climate change potentially worsens outbreaks.

Research Question and Hypothesis

1.Research Questions

Do climatic factors affect the abundance of Aedes mosquito larvae?

2.Research Hypothesis

Climatic factors have an impact on the abundance of Aedes mosquito larvae.

Methodologyds and Materials

Research Instruments

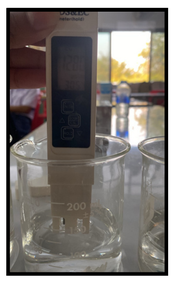
1. (Water TestStrips) 2. Water Quality Tester (TDS/EC) 3. Smartphone 4. App GLOBE Observer

Materials and Methods

Systematic surveys and data collection were performed to determine the abundance of Aedes mosquito larvae. The study sites included three villages in Phak Mai Subdistrict, Huai Thap Than District, Province, namely 1. Ban Du 2.Ban Phrai Phana 3.Ban Ta Thong.

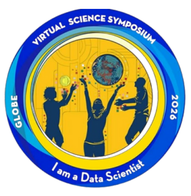

1.Sampling mosquitoes from water buckets.


2.Conduct an Aedes larval survey


3.Determine the EC value

4.Measure the pH level

Optional Badges



1. I AM A DATA SCIENTIS

2. I MAKE AN IMPACT

3. I AM A COLLABORATOR

Results

Village	Total Households			Total Containers		BI	HI	Risk Area Analysis
	Total	Survey	Found Larvae	Survey	Found Larvae			
Du Village	51	40	12	306	20	50.00	30.00	High Risk
Phrai Phanao Village	55	55	2	470	2	3.64	3.64	Low Risk
Ta Thong Village	38	38	5	388	6	15.79	13.16	High Risk

Table 1 Summary of the survey on the prevalence of Aedes mosquito larvae conducted between 16–22 June 2025.

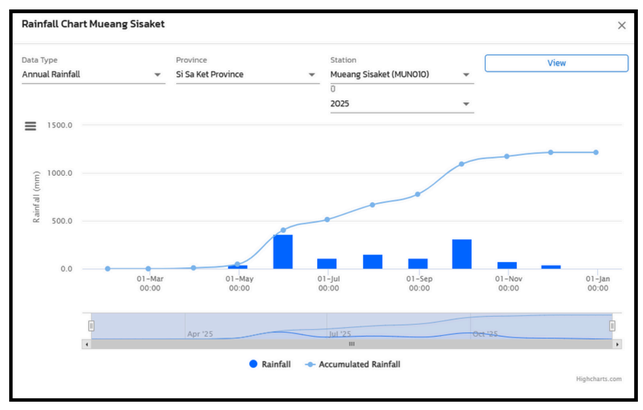
Ban Du and Ban Ta Thong face higher risks than Ban Phrai Phanao, primarily due to higher population density leading to increased mosquito breeding sites. Consequently, both villages recorded significantly higher House Index (HI) and Breteau Index (BI) values.

The coordinates of Sisaket Province		
Day/Month/Year	Temperature	Decrease in temperature
21/7/2025	25.1	24.4
21/7/2025	26	24.6
21/7/2025	24.8	24.3
22/7/2025	24.7	24.2
23/7/2025	25.5	24.6
23/7/2025	24.3	23.8
23/7/2025	24.3	23.6
23/7/2025	26	24.6
23/7/2025	25.6	23.3
23/7/2025	26.8	23.3
23/7/2025	27.5	24.5
23/7/2025	29.2	25.8
23/7/2025	29.2	25.8
23/7/2025	29.1	24.2
23/7/2025	30.2	25.7
23/7/2025	30.1	26.5
23/7/2025	28.4	25.8
23/7/2025	27.3	22.2
23/7/2025	25.7	20.7
23/7/2025	26.9	25.5
23/7/2025	25.7	24.5
23/7/2025	25.5	24.6
23/7/2025	26.5	24.9
24/7/2025	25.4	24.4

Table 2 Sisaket Province experienced distinct diurnal temperature variations, ranging from a low of 24.3°C at night to a daytime peak of 30.2°C

The coordinates of the school flagpole area		
Day/Month/Year	Day/Month/Year	Temperature
18/7/2025 5:00	18/7/2025 11 : 49	29
21/7/2025 1:30	21/7/2025 8 : 18	26
20/7/2025 1:30	20/7/2025 8 : 18	29
22/7/2025 1 : 00	22/7/2025 7 : 48	29
23/7/2025 1 : 00	23/7/2025 10: 48	27
23/7/2025 4 : 00	23/7/2025 10: 48	30
23/7/2025 4 : 00	23/7/2025 10: 48	30
23/7/2025 5 : 18	23/7/2025 12 : 06	31
23/7/2025 5 : 00	23/7/2025 11 : 48	32
23/7/2025 5 : 16	23/7/2025 12 : 04	31
23/7/2025 5 : 10	23/7/2025 11 : 58	32
23/7/2025 5 : 00	23/7/2025 11 : 48	32
23/7/2025 4 : 40	23/7/2025 11 : 28	28
23/7/2025 6 : 08	23/7/2025 12 : 56	31
23/7/2025 9 : 03	23/7/2025 15 : 51	31
23/7/2025 8 : 50	23/7/2025 15 : 38	32
23/7/2025 5 : 30	23/7/2025 12 : 18	30
23/7/2025 6 : 00	23/7/2025 12 : 48	31
23/7/2025 9 : 00	23/7/2025 15 : 48	30
23/7/2025 15 : 50	23/7/2025 15 : 50	28

Table 3 From July 18-24, 2025, data collected at Phak Mai Wittayanukul School showed temperatures ranging from 26°C to 32°C. Most readings clustered between 28°C and 31°C, indicating consistently high daytime heat."



Although heavy rainfall (June–July 2025)

Correlated with higher larval indices, villages practicing active breeding site elimination maintained low levels. This confirms that environmental management is a critical vector control strategy, even during high-risk rainy seasons."

Conclusion and Discussion

Research Summary: Climate and Aedes Mosquito Larvae in Si Sa Ket

1. Objective: To analyze how weather affects the density of Aedes mosquito larvae (Dengue vectors) in Phak Mai Subdistrict.

2. Key Findings:

2.1 High Risk: Larval indices (HI and BI) exceeded safety standards, indicating a high risk of Dengue.

2.2 The Weather Factor: The rainy season (June–August 2025) saw the highest larval numbers. High rainfall and humidity created more breeding sites, while temperatures of 26–32°C were ideal for rapid mosquito growth.

3. Conclusion: There is a direct link between wet/humid weather and increased mosquito populations.

4. Recommendation: Prevention strategies should not just target adult mosquitoes but must focus on eliminating breeding sites (stagnant water) during the rainy season. Using weather data to predict risks can help communities plan more effective, proactive control measures.

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