

# Development of plant pots to mitigate mosquito populations

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## Abstract

This project, Development of plant pots to mitigate mosquito populations, aims to develop a plant pot capable of trapping mosquitoes and reducing water usage while studying the effect of different light colors on mosquito attraction. The team designed the mosquito-trapping plant pot based on mosquito oviposition behavior, where mosquitoes typically lay eggs on water surfaces. The pot was designed with a water reservoir at the bottom and a mosquito trap on the side, consisting of rectangular slots lined with black felt fabric, mimicking the damp black surfaces that mosquitoes are naturally attracted to. Once mosquitoes enter, they cannot escape. When mosquitoes lay eggs on the water surface, the larvae develop as usual, but adult mosquitoes cannot exit the trap. Additionally, a sturdy cotton rope was placed between the soil and the water reservoir, allowing water absorption to sustain plant growth in drought or high-temperature conditions. To evaluate the effect of light color on mosquito attraction, three mosquito-trapping plant pots illuminated with different light colors, including blue, purple, and green, were placed in the same area. Humidity was measured daily over two weeks, and the number of mosquitoes in each pot was recorded and monitored through different life cycle stages. Among the three versions tested, Version 2 showed the highest number of pupae and adult mosquitoes, indicating superior trapping efficiency. Both tested versions of the mosquito-trapping plant pot were also designed to enhance soil moisture using cotton rope. However, the soil moisture levels did not significantly differ at the 0.05 significance level. Regarding the effectiveness of different light colors in attracting mosquitoes in Version 2, the results showed a significant difference at the 0.05 level, with purple light being the most attractive to mosquitoes. This innovation is expected to contribute to mosquito population control while promoting plant growth, providing useful data for developing control measures and monitoring strategies in areas at risk of mosquito-borne diseases. Keywords: Mosquito trap; Plant pot; Mosquitoes.

## Introduction

Thailand has a lot of mosquitoes.

Life cycle of the Aedes mosquito

prototype of mosquito trapping plant pots

## A Research Question

- Can the developed innovation effectively trap or attract mosquitoes to lay eggs?
- Can the developed innovation reduce water consumption for plant irrigation?

## Hypothesis

- The mosquito-trapping plant pot can effectively trap Aedes mosquitoes and help prevent their spread.
- The mosquito-trapping plant pot and the color of light influence mosquito attraction.
- The mosquito-trapping plant pot can reduce water usage for plant irrigation.

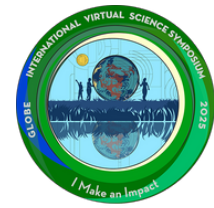
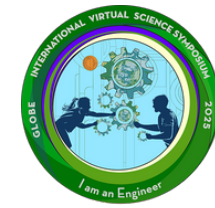
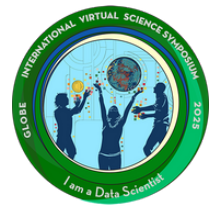
## Objective

- To develop a plant pot that can trap mosquitoes.
- To study the effectiveness of light color on mosquito attraction.
- To study the effectiveness of water usage in plant irrigation.

## Methodology

- Design and Development of Mosquito-Trapping Plant Pots**  
Study the structure of the prototype plant pot to be developed and design a draft of the mosquito-trapping plant pot using SketchUp (version 1).
- Testing the Effectiveness of the Mosquito-Trapping Plant Pot**  
Place the mosquito-trapping plant pot Version 1 around the school for two weeks. Measure soil moisture, temperature, relative humidity, and light levels in the test area daily. Count the number of mosquitoes in each pot and track them according to the different stages of the mosquito life cycle.
- Analyze the test results, identify the shortcomings, and improve the mosquito-trapping plant pot, developing it into Version 2.**
- Study the effectiveness of light color in attracting mosquitoes.**  
Perform the same procedure as in Step 2, but replace it with the mosquito-trapping plant pot Version 2.
- Analysis of the experiment results.**  
Analyze and present the results in table and graph format using Microsoft Excel.

## Badges



### I AM A DATA SCIENTIST

- There are emphasize data collection and analysis to address environmental issues. The plant pot project studied mosquito attraction, finding that purple light was most effective. It highlights the importance of organizing data, using statistical analysis, and discussing results to identify trends and limitations. This project demonstrates how citizen science can help solve real-world problems like mosquito control and environmental management.

### I AM AN ENGINEER

- The project develops a mosquito-trapping plant pot that conserves water and supports plant growth. It uses mosquito oviposition behavior and light color attraction, with purple being the most effective. The design enhances soil moisture, demonstrating an engineering solution that controls mosquitoes while promoting sustainability.

### I MAKE AN IMPACT

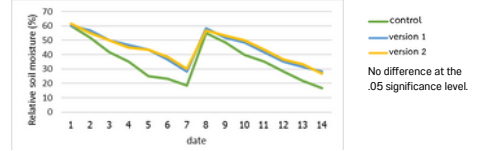
- The project tackles mosquito-borne diseases by developing a plant pot that traps mosquitoes while conserving water and supporting plant growth. It highlights the effectiveness of purple light in attracting mosquitoes, offering practical insights for disease prevention. By addressing a local issue with global relevance, the innovation provides a sustainable and scalable solution for mosquito control and public health improvement.

## Results

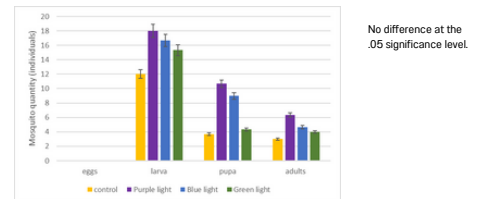
### Experiment 1: Testing the effectiveness of the mosquito-trapping plant pot.

type	Mosquito quantity (individuals)			
	Eggs	Larva	Pupa	Adults
prototype	0	27	8	3
version 1	0	33.33 ± 1.25	10.67 ± 2.05	4 ± 0.82
version 2	0	36.33 ± 2.87	12.67 ± 2.50	6.67 ± 1.25

### Experiment 2: Study of soil moisture.



### Experiment 3: The effectiveness of light color on mosquito attraction.



## Conclusion and Discussion

- The development of mosquito-trapping plant pots focuses on improving trapping efficiency based on mosquito behavior.
- Each version has different trapping effectiveness. Version 1 increases water surface area to encourage egg-laying, while Version 2 modifies the entrance and uses black fabric, increasing capture rates, as shown in Ursula Benz's 2024 research on mosquito attraction to black.
- Both versions use cotton strings to maintain soil moisture, with no significant difference at the 0.05 level.
- Purple light attracts mosquitoes more than other colors, consistent with Pairpailin Jhaiaun's 2021 research.
- Combining both versions may enhance trapping efficiency and moisture retention, offering a potential tool for mosquito control.