

Article

UV Light-Emitting-Diode Traps for Collecting Nocturnal Biting Mosquitoes in Urban Bangkok

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Simple Summary: This study was conducted to evaluate the efficacy of six ultraviolet light-emitting diodes (UV-LED) traps and a fluorescent light trap for sampling urban nocturnal mosquitoes. Results demonstrated that the fluorescent light trap outperformed all the UV-LED traps throughout the 72 sampling nights and between wet and dry seasons. Among the UV-LED traps, the LED375 trapped the highest number of mosquitoes. Additional field trials are needed to validate these findings in different ecological settings.

Abstract: Well-designed surveillance systems are required to facilitate a control program for vector-borne diseases. Light traps have long been used to sample large numbers of insect species and are regarded as one of the standard choices for baseline insect surveys. The objective of this study was to evaluate the efficacy of six ultraviolet light-emitting diodes and one fluorescent light for trapping urban nocturnal mosquito species within the Kasetsart University (KU), Bangkok. Ultraviolet light-emitting diodes (UV-LEDs), (LED365, LED375, LED385, LED395, and LED405) and a fluorescent light were randomly assigned to six different locations around the campus in a Latin square design. The traps were operated continuously from 18:00 h to 06:00 h throughout the night. The traps were rotated between six locations for 72 collection-nights during the dry and wet seasons. In total, 6929 adult mosquitoes were caught, with the most predominant genus being *Culex*, followed by *Aedes*, *Anopheles*, *Armigeres* and *Mansonia*. Among the *Culex* species, *Culex quinquefasciatus* ($n = 5121$: 73.9%) was the most abundant followed by *Culex gelidus* ($n = 1134$: 16.4%) and *Culex vishnui* ($n = 21$: 0.3%). Small numbers of *Aedes*, *Armigeres*, and *Anopheles* mosquitoes were trapped [*Aedes albopictus* ($n = 219$: 3.2%), *Aedes pocilius* ($n = 137$: 2.0%), *Armigeres subalbatus* ($n = 97$: 1.4%), *Anopheles vagus* ($n = 70$: 1.0%), *Aedes aegypti* ($n = 23$: 0.3%)]. There were 2582 specimens (37.2%) captured in fluorescent light traps, whereas 942 (13.6%), 934 (13.5%), 854 (12.3%), 820 (11.8%), and 797 (11.5%) were captured in the LED375, LED405, LED395, LED365, and LED385 traps, respectively. None of the UV-LED light traps were as efficacious for sampling nocturnal mosquito species as the fluorescent light trap. Among the five UV-LED light sources, LED375 trapped the greatest number of mosquitoes. Additional field trials are needed to validate these findings in different settings in order to substantially assess the potential of the LEDs to trap outdoor nocturnal mosquitoes.

Keywords: light traps; fluorescent; *Culex*; *Aedes*; Thailand



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1. Introduction

Vector control is a key component of disease control and elimination. Several tools are under development to determine distribution, abundance, and infection rate of the mosquito, among which various traps are of interest for mosquito sampling and surveillance [1]. Light traps have been used for a long time as a common basic surveying equipment device for insects, and there have been many variations in the design of light traps