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# Semi-field evaluation of novel chemical lures for *Aedes aegypti*, *Culex quinquefasciatus*, and *Anopheles minimus* (Diptera: Culicidae) in Thailand

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## Abstract

**Background:** Entomological surveillance is an important means of assessing the efficacy of insect vector management programs and estimating disease transmission thresholds. Among baited traps, Biogents' BG-Sentinel (BGS) trap baited with BG-Lure is considered to have the most similar outcome to, and be a possible replacement for, human-landing catches for the epidemiologically relevant monitoring of adult *Aedes aegypti* and *Culex quinquefasciatus*. In contrast to the BGS trap, the Black Hole ultraviolet (UV) light trap, which is widely used to catch nocturnal flying insects, is not baited with synthetic human odor-mimicking lures.

**Methods:** We evaluated the L-lactic acid-based Kasetsart University (KU)-lures nos. 1–6 as novel candidate chemical lures for the diurnal species *Ae. aegypti* and the nocturnal species *Cx. quinquefasciatus* using two commercial traps (the BGS trap and the Black Hole UV light trap) in a semi-field screen (SFS) house. Firstly, we optimized the dose of each KU-lure in an SFS house (140 m<sup>3</sup>). Secondly, six different candidate KU-lures were screened by comparing their percent attraction using a single discriminating dose (0.5 g). Finally, we evaluated the synergism of the KU-lures selected in this way with commercially available traps.

**Results:** BGS traps baited with KU-lure no. 1 exhibited the greatest percent attraction for *Ae. aegypti* (29.5% ± 14.3%), whereas those baited with KU-lure no. 6 most strongly attracted *Cx. quinquefasciatus* (33.3% ± 10.7%). Interestingly, BGS traps treated with 10 g BG-Lure did not significantly attract more *Ae. aegypti* or *Cx. quinquefasciatus* than the untreated BGS traps. CO<sub>2</sub> at a flow rate of 250 ml/min most strongly attracted both *Ae. aegypti* and *Cx. quinquefasciatus* (42.2% ± 14.2% and 75.1% ± 16.9%, respectively). BGS and Black Hole UV light traps with KU-lure no. 6 exhibited a stronger attraction for *Cx. quinquefasciatus* than untreated traps, and the percent attraction did not differ between the treated traps.

**Conclusions:** Synergistic effects of KU-lures nos. 1 and 6 with the mosquito traps were demonstrated for both the diurnal and nocturnal species in the SFS house assays. However, further studies are urgently needed for the development of species-specific lures to increase trap efficacy in the field for local vector mosquitoes in Thailand.

**Keywords:** Attractant, BG-Lure, Kasetsart University-lure, BG-Sentinel trap, Black Hole ultraviolet light trap, Semi-field screen house assay

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## Background

Dengue, the most prevalent vector-borne disease of public health importance, occurs in most countries in



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