

**PENGEMBANGAN ALAT PENGENDALIAN VEKTOR *Aedes aegypti* BERBASIS KOMBINASI MULTIMODA**

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**ABSTRAK**

**Latar belakang:** Bidang entomologi kesehatan merupakan *niche market* yang tumbuh seiring dengan globalisasi. Ketersediaan produk entomologi kesehatan penting untuk mendukung pengendalian vektor. Sejarah penggunaan perangkap nyamuk dimulai pada tahun 1934, perangkap New Jersey dengan keefektifan 10,2%, perangkap CDC(1962) dengan keefektifan 18,1%, Perangkap AMSS(1980) dengan keefektifan 36,2%, dan perangkap EVS tingkat keefektifan 48,3 sampai dengan 54,3%. Penelitian difokuskan pada pengembangan alat pengendalian *Ae. aegypti* berbasis kombinasi multimoda dengan memanfaatkan sifat fisiologi nyamuk yaitu indera penciuman, penglihatan dan pendengaran.

**Metode :** Penelitian ini merupakan Quasi Eksperimen yang bertujuan membuat prototipe perangkap multimoda serta menguji aspek performa teknik dan fungsi prototipe pada skala laboratorium. Jumlah sampel nyamuk *Aedes aegypti* betina 2.850 ekor. Variabel dalam penelitian ini adalah pengembangan alat pengendalian nyamuk *Ae. aegypti*. Penelitian diawali dengan penetapan misi (M), identifikasi kebutuhan (I), pendefinisian spesifikasi produk (S), pembuatan konsep desain (K), pemilihan konsep desain (K) dan dilanjutkan dengan pengujian prototype. Analisa dengan uji General linear model.

**Hasil:** Pengujian 24 jam di *Glass Chamber* untuk atraktan tunggal, jumlah nyamuk mati terperangkap tertinggi pada atraktan asam laktat dengan 76% sampai dengan 80%. Pada atraktan kombinasi 2 moda yang tertinggi gabungan asam laktat dengan frekuensi suara 60% sampai dengan 78%. Pada atraktan kombinasi 3 moda yang tertinggi kombinasi sinar ultraviolet, frekuensi suara dan asam laktat 64% sampai dengan 90%. Pada atraktan kombinasi 4 moda (sinar ultraviolet, frekuensi suara, karbon dioksida dan asam laktat) rerata jumlah nyamuk mati terperangkap sebesar 98%. Hasil pengujian 24 jam di ruangan tertutup jumlah nyamuk terperangkap/mati tertinggi pada perangkap multimoda dengan persentase kematian 80%, perangkap Photocatalyst Mosquito & Fly Trap dengan rerata kematian 36% sampai dengan 50%, perangkap Mosquito Killer BG-360 dengan persentase kematian 18% sampai dengan 30% dan perangkap kontrol negatif dengan persentase kematian 2% sampai dengan 4%.

**Kesimpulan:** Prototipe perangkap mulimoda lebih efektif dibandingkan dengan Mosquito Killer BG-360 dan Photocatalyst mosquitio & fly trap. Ada perbedaan jumlah nyamuk yang mati / terperangkap antara jam pertama, jam ke-2, dan jam ke-24.

**Kata kunci:** Perangkap Multimoda, Mosquito Killer BG-360, Photocatalyst Mosquitio & fly trap, *Aedes aegypti*.

### Development of *Aedes aegypti* Vector Control Tool Based on Multimodal Combination

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#### ABSTRACT

**Background:** Health entomology is a "niche market" that grows with globalization. The availability of health entomology products is important to support vector control. The history of the use of mosquito traps began in 1934 with New Jersey traps with 10.2% effectiveness, CDC traps (1962) with 18.1% effectiveness, AMSS Traps (1980) with 36.2% effectiveness, and EVS traps with 48.3% to 54.3% effectiveness. The research is focused on the development of a multimodal *Ae. aegypti* control device based on the physiological characteristics of mosquitoes sense of smell, sight, and hearing.

**Methods:** This research is an experiment that aims to make a multimodal trap prototype and test the aspects of technical performance and function of the prototype at a laboratory scale. The number of female *Ae. aegypti* mosquito samples was 2.850. The variable in this study was the development Control Tool of *Ae. aegypti*. The research begins with the determination of the mission (M), identification of needs (I), defining product specifications (S), making design concepts (K), selecting design concepts (K) and continuing with prototype testing. Analysis with the General linear model test.

**Results:** The 24-hour test results in Stanning jar on a single attractant, the highest number of trapped / dead mosquitoes at lactic acid attractant with a mean trapped / dead 76% to 80%. At the two-mode combination attractants the highest combined lactic acid with a sound frequency of 60% to 78%. In the three-mode combination attractants the highest combination of ultraviolet light, sound frequency and lactic acid 64% to 90%. At attractors combination of 4 modes (ultraviolet light, sound frequency, carbon dioxide and lactic acid) the average number of mosquitoes trapped / dead was 98%. The results of 24-hour testing indoors the highest number of trapped / dead mosquitoes in multimodal traps with a mortality rate of 80%, photocatalyst mosquito traps & fly traps with a mortality rate of 36% to 50%, and a Mosquito Killer BG-360 trap with a death rate of 18%-30% and a negative control trap with a death rate of 2% to 4%.

**Conclusion:** The multimodal trap prototype is more effective than the control traps (Mosquito Killer BG-360 and Photocatalyst mosquito & fly trap). There is a difference in the number of dead/trapped mosquitoes between the 1<sup>st</sup> hour, the 2<sup>nd</sup> hour, and the 24<sup>th</sup> hour.

**Keywords:** *Multimodal Traps, Mosquito Killer BG-360, Photocatalyst Mosquitio & fly trap, Aedes aegypti.*