

INNOVATION OF INSECT TRAP MODELS FOR SUSTAINABLE PEST CONTROL OF COCOA PLANT (*Theobroma cacao* L.)

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ABSTRACT

Cocoa production in Indonesia faces a serious threat from pest infestations, which negatively affect yield and quality. This study aimed to develop and evaluate an innovative insect trap that combines visual cues and light attraction for sustainable pest management in cocoa plantations. The research was conducted using a Completely Randomized Design (CRD) in a cocoa plantation in Gunungkidul, Yogyakarta. The parameters evaluated included pest capture efficiency, arthropod diversity, evenness, and species richness. The effectiveness of trap types was analyzed using ANOVA, while the effects of treatment components were examined using orthogonal contrast analysis. The Shannon–Wiener diversity index was also calculated. The results showed that the trap model significantly affected the total number of arthropods captured, with the Innovative Tube Blue Trap capturing the highest number of individuals compared with the other treatments (995 individuals). Orthogonal contrast analysis indicated that trap shape (tube and burger) had a significant effect on total captures ($p = 0.010$). The Kruskal–Wallis test further showed that trap models had a significant effect on the abundance of pest, neutral, parasitoid, and decomposer groups. The highest Shannon–Wiener diversity index was recorded in Innovative Burger Yellow ($H' = 3.15$), indicating a high level of arthropod evenness and diversity.

Keywords: *Innovative Trap, Cocoa Pest, Sustainable Agriculture, Yellow Traps, integrated pest management*

INOVASI MODEL PERANGKAP SERANGGA UNTUK PENGENDALIAN HAMA TANAMAN KAKAO (*Theobroma cacao* L.) YANG BERKELANJUTAN

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ABSTRAK

Produksi kakao di Indonesia menghadapi ancaman serius akibat serangan hama, yang berdampak negatif pada hasil panen dan kualitas. Studi ini bertujuan untuk mengembangkan dan mengevaluasi perangkap serangga inovatif yang menggabungkan daya tarik visual dan cahaya untuk pengelolaan hama berkelanjutan di perkebunan kakao. Penelitian ini dilakukan menggunakan Rancangan Acak Lengkap di perkebunan kakao di Gunung Kidul, Yogyakarta. Parameter yang dievaluasi meliputi efisiensi penangkapan hama, keragaman arthropoda, keseragaman, serta kekayaan spesies. Efektivitas jenis perangkap dianalisis menggunakan uji ANOVA. Pengaruh komponen antarperlakuan dianalisis menggunakan uji kontras ortogonal, dihitung juga indeks keragaman Shannon–Wiener. Hasil penelitian menunjukkan bahwa pengaruh model perangkap berpengaruh terhadap total perolehan arthropoda, di mana perangkap inovatif Tabung Biru menangkap lebih banyak hama daripada perangkap lain (995 individu). Uji kontras ortogonal menunjukkan bahwa perbedaan komponen bentuk perangkap (tabung dan burger) berpengaruh secara signifikan terhadap total tangkapan ($p = 0.010$). Hasil uji Kruskal-Wallis menunjukkan bahwa model perangkap berpengaruh nyata terhadap hasil tangkapan peran hama, netral, parasitoid, dan dekomposer. Indeks keragaman Shannon–Wiener tertinggi ada pada Model A (Burger Kuning + cahaya) dengan hasil ($H' = 3.15$) yang mengindikasikan keseragaman arthropoda.

Kata Kunci: Perangkap Inovatif, Hama Kakao, Pertanian Berkelanjutan, Perangkap Kuning, Pengendalian Hama Terpadu