

STATUS RESISTENSI TERHADAP MALATHION DAN MUTASI GEN *ACE-1* NYAMUK *Aedes aegypti* (LINNAEUS, 1762) DARI KOTA SORONG, PAPUA BARAT DAYA

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INTISARI

Kelurahan Pal Putih melaporkan jumlah kasus Demam Berdarah Dengue (DBD) tertinggi di Kota Sorong selama tiga tahun berturut-turut. Penggunaan yang terus-menerus dan tidak tepat terhadap insektisida seperti malathion; dapat menyebabkan resistensi pada populasi *Aedes aegypti*. Penelitian ini bertujuan untuk mendeteksi adanya mutasi gen *ace-1* dan menganalisis hubungannya dengan status resistensi malathion pada *Ae. aegypti*, sekaligus menilai tingkat pengetahuan masyarakat mengenai infeksi DBD di Pal Putih, Kota Sorong. Sampel dikumpulkan menggunakan ovitrap di 44 lokasi, dan nyamuk dibiakkan hingga generasi F₂ untuk identifikasi. Secara bersamaan, wawancara dilakukan untuk mengevaluasi pengetahuan masyarakat tentang DBD. Resistensi insektisida diuji menggunakan dua metode: WHO *impregnated paper* (0,8% malathion) dan uji CDC *bottle bioassay* (5 µg/mL malathion, 1x). Pengujian molekuler dilakukan pada sampel gabungan untuk mendeteksi gen resistensi. Analisis data mencakup perhitungan tingkat *knockdown* dan mortalitas nyamuk berdasarkan waktu diagnostik. Hasil dari uji WHO *impregnated paper* menunjukkan adanya kerentanan, dengan analisis probit menghasilkan nilai *Knockdown Time* (KdT) sebesar KdT₅₀ = 15,995 menit dan KdT₉₀ = 20,456 menit. Sebaliknya, uji CDC *bottle bioassay* menunjukkan resistensi sedang, dengan nilai *Lethal Time* (LT) sebesar LT₅₀ = 22,287 menit dan LT₉₀ = 29,566 menit. Perbedaan antara kedua uji tersebut mungkin dipengaruhi oleh variasi asal populasi nyamuk yang menunjukkan potensi awal peningkatan toleransi terhadap malathion pada *Ae. aegypti*. Secara khusus, pengurutan DNA nyamuk dari uji CDC *bottle bioassay* tidak menunjukkan adanya mutasi pada gen *ace-1*. Meskipun masyarakat menunjukkan tingkat pengetahuan yang baik mengenai DBD, upaya nyata yang berkelanjutan dan pemantauan penting untuk memperkuat praktik pencegahan dan mendukung kesehatan masyarakat.

Kata Kunci : *Aedes aegypti*, gen *ace-1*, malathion *Impregnated Paper*, Sorong Papua.

***MALATHION RESISTANCE STATUS AND ACE-1 GENE MUTATION IN
Aedes aegypti (LINNAEUS, 1762) FROM SORONG CITY, SOUTHWEST PAPUA***

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ABSTRACT

*Pal Putih Subdistrict reported the highest number of Dengue Hemorrhagic Fever (DHF) cases in Sorong for three consecutive years. The continuous and improper use of insecticides such as malathion can lead to resistance in *Aedes aegypti* populations. This study aims to detect the presence of the ace-1 gene mutation and analyze its relationship with malathion resistance status in *Ae. aegypti*, while also assessing the level of community knowledge regarding DHF in Pal Putih, Sorong City. Samples were collected using ovitraps at 44 sites, and mosquitoes were reared to the F₂ generation for identification. Concurrently, interviews were conducted to evaluate community knowledge of DHF. Insecticide resistance was tested using two methods: WHO-impregnated paper (0.8% malathion) and CDC bottle bioassay (5 µg/mL malathion, 1x). Molecular testing was performed on pooled samples to detect resistance genes. Data analysis involved calculating mosquito knockdown and mortality rates based on diagnostic times. Results from the WHO-impregnated paper test indicated susceptibility, with probit analysis yielding Knockdown Time values of $KdT_{50} = 15.995$ minutes and $KdT_{90} = 20.456$ minutes. In contrast, the CDC bottle bioassay indicated moderate resistance, with Lethal Time values of $LT_{50} = 22.287$ minutes and $LT_{90} = 29.566$ minutes. The discrepancy between the two tests may be influenced by variations in mosquito population origin, suggesting an early potential for increased tolerance to malathion in *Ae. aegypti*. Notably, DNA sequencing of mosquitoes from the CDC bioassay showed no mutations in the ace-1 gene. Although the public demonstrates a good level of knowledge about DHF, sustained concrete efforts and monitoring are essential to strengthen prevention practices and support public health.*

Keywords : ace-1 gene, Aedes aegypti, malathion Impregnated Paper, Sorong Papua