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## ABSTRACT

**Title of Abstract** : Pyrethroid Resistance in Aedes Mosquitoes in East Kalimantan, Indonesia: Systematic Review 2005-2025  
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**Background** : Synthetic pyrethroid insecticides remain the primary vector control strategy for Aedes sp. mosquitoes, the principal vectors of dengue, Zika, and chikungunya. Understanding regional resistance patterns is crucial for effective vector management programs in endemic areas.

**Objective** : To systematically review and synthesize evidence on pyrethroid insecticide resistance status in Aedes sp. populations in East Kalimantan Province, Indonesia, from 2005 to 2025

**Research Methods/ Implementation Methods** : A systematic literature review was conducted following PRISMA 2020 guidelines. Multiple databases including PubMed, Scopus, Web of Science, Google Scholar, Indonesian Publication Index, and grey literature sources were searched from January 2005 to October 2025. Studies reporting pyrethroid resistance in Aedes sp. from East Kalimantan were included. Data extraction followed PICO framework: Population (Aedes aegypti and Ae. albopictus), Intervention (pyrethroid exposure), Comparison (susceptible strains), and Outcome (resistance status, mortality rates, knockdown times, molecular markers). Quality assessment was performed using a modified Newcastle-Ottawa Scale

**Results** : Eight studies met inclusion criteria, encompassing data from multiple districts in East Kalimantan. Confirmed pyrethroid resistance was documented in Ae. aegypti populations across the province. Permethrin resistance ratios (RR<sub>50</sub>) ranged from 4.08× to 127×, while deltamethrin resistance ranged from 4.37× to 72.20×. Banjarmasin populations showed mortality rates of 51.67% to permethrin and 68.33% to deltamethrin. High frequencies of kdr mutations (F1534C and V1016G) were detected, along with elevated metabolic enzyme activities. Synergist assays demonstrated significant involvement of cytochrome P450 monooxygenases and esterases in resistance mechanisms

**Conclusion/Lesson Learned** : High-level pyrethroid resistance is widespread in Aedes aegypti across East Kalimantan, driven by both kdr and metabolic mechanisms, compromising current vector control efforts. Immediate adoption of insecticide resistance management—such as rotation, synergist use, and integrated vector management—is essential to restore control effectiveness and reduce dengue transmission risk.

**keyword** : Aedes sp; pyrethroid resistance; East Kalimantan; systematic review