

Determination Of Mechanism Of Resistance To Pyrethroid By Anopheles Gambiae Sensu Lato From Gombe State, Nigeria

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Abstract : The emergence of insecticide resistance in *Anopheles gambiae sensu lato* poses a significant challenge to malaria control efforts, particularly in endemic regions like Gombe, Nigeria. This study aimed to investigate the mechanisms underlying pyrethroid resistance and identify the prevalent *Anopheles* species in the area. Morphological identification was performed using keys from Gille and Coetzee, confirmed by molecular techniques employing SINE200 PCR for precise species characterization. The results revealed that the *Anopheles gambiae* complex comprised 75% of the mosquito population, indicating its dominance in the region. Knockdown rate bioassays demonstrated a time-dependent increase in resistance to insecticides, with notable exceptions observed with deltamethrin. Susceptibility testing conducted 24 hours post-exposure confirmed that the population exhibited resistance to all tested insecticides, with DDT showing the highest resistance level. Molecular analysis identified *Anopheles coluzzii* as the most prevalent species in Gombe, followed by *Anopheles arabiensis*. Additionally, the prevalence of *kdr* alleles was assessed, revealing a significant correlation between the L1014F mutation and resistance phenotypes. Specifically, the frequency of the L1014F allele was linked to increased resistance levels, while the homozygous susceptible allele was also prevalent, suggesting the potential influence of other resistance mechanisms. In conclusion, this study highlights the critical need for ongoing surveillance of insecticide resistance in *Anopheles gambiae* populations. It underscores the importance of understanding the genetic basis of resistance to inform effective vector control strategies. The findings emphasize that adaptive management of insecticide use, considering the dynamics of resistance and species composition, is essential for enhancing malaria control efforts in Gombe State, Nigeria and similar regions.

Keywords : pyrethroid insecticide, resistance, susceptible, PCR, malaria

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