

ABSTRACT

GENETIC EVIDENCE OF PERMETHRIN RESISTANCE IN THE HUMAN HEAD LOUSE (*PEDICULUS HUMANUS CAPITIS*) FROM THE SAN JOAQUIN VALLEY AND SAN FRANCISCO BAY AREA, CALIFORNIA

Pediculus humanus capitis, human head lice, are parasitic arthropods with many populations that have evolved drug resistance to the chemical permethrin, a common component of louse treatment shampoos. Resistance to permethrin is correlated with four point mutations that occur simultaneously within the sodium channel α -subunit gene of the head louse nuclear genome. The prevalence of resistance within and between louse populations varies geographically, and the exact location of resistant populations within the United States, including California, is unknown. This study investigated the prevalence of resistance and phylogenetic relationships within and between louse populations in the greater San Francisco Bay (SFB) area and Fresno, California. All lice collected in the SFB area ($n = 134$) were resistant to permethrin; in Fresno, 12 of 52 lice (21.15%) were susceptible. Susceptible lice formed a distinct clade in phylogenies resolved by Maximum Parsimony (all 12 lice), Neighbor Joining (11 of 12 lice), and Bayesian Methods (all 12 lice), indicating restricted gene flow between susceptible and resistant lice. This study was the first to utilize sequence data from the locus expressing resistance to resolve evolutionary relationships between louse populations.

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