

POPULATION GENETIC STRUCTURE OF *ANOPHELES MACULATUS* IN THAILAND

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Anopheles (Cellia) maculatus Theobald is major malaria vector in southern Thailand and peninsular Malaysia, and previous studies on the population genetics of this mosquito suggested that mountain ranges reduced gene flow among some populations. In this study we examine the genetic variance among 5 populations in southern Thailand by analyzing 7 microsatellite loci. All microsatellite loci exhibited moderate to high genetic variability for all populations with an average of 8.6 (range = 6.3-10.9) alleles per locus. Based on microsatellite analysis, geographic populations of southern populations of *An. maculatus* can be grouped in two clusters; one includes 3 populations located on the west side of the Phuket mountain range between 8° and 10° north latitude, and the other includes 2 populations east of the Phuket mountain range located between approximately 6.5° and 10° north latitude. Wright's F_{st} and Slatkins' R_{st} for all seven microsatellite loci indicated very low estimates of differentiation among the 3 populations west of the Phuket range (mean values of F_{st} and R_{st} = 0.0042 and 0.0031, respectively, corresponding to N_m values of 59.3 and 80.2, respectively), suggesting significant gene flow occurs among populations. However, there is some evidence that there is some restriction of gene flow between populations on different sides of the Phuket range (mean values of F_{st} and R_{st} = 0.0346 and 0.0606, respectively, corresponding to N_m values of 7.0 and 3.9, respectively). Populations separated by distances as little as 80 km exhibit restriction of gene flow when separated by geographic barriers, while populations separated by more than 650 km without geographic barriers exhibit greater gene flow.

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REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM APPLICATIONS ON MALARIA RESEARCH IN THAILAND

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Geographic Information Systems (GIS) are powerful tools for studying and mapping the spatial relationships of objects. The spatial data managed by a GIS program may include items such as localities where mosquitoes have been collected, insect densities, distributions of mosquitoes relative to environmental parameters such as climate or vegetation, human artifacts such as political boundaries or roads, boundaries of crop fields, geologic information such as topography and soil type, etc. Similar types of data are typically grouped into individual layers or themes. The display of these layers can be turned on or off and modified as to how data are displayed. An important strength of GIS is that it can simultaneously relate layers of data for the same points in space and can analyze and map out the results. Thailand is the home to approximately 13% of the described mosquito species of the world. Control of malaria requires case detection