

Genetic diversity of *Anopheles funestus* (Diptera:Culicidae) populations and its association with malaria transmission in some ecological sites in Ghana

Samuel Dadzie^{1,2}, Maxwell Appawu¹, Michael Wilson¹, and Ruth Brenyah²

¹*Noguchi Memorial Institute for Medical Research, University of Ghana, Legon, Ghana;*

²*Kwame Nkrumah University of Science and Technology, School of Medical Sciences, Dept. of Clinical Microbiology, Kumasi, Ghana*

Abstract

Malaria disease is highly endemic in tropical Africa because the continent is home to *Anopheles gambiae* Giles, *Anopheles arabiensis* Patton and *Anopheles funestus* Giles, the three most efficient vectors in the world. Vector control has been difficult because of the complexities of the different vector species at the population levels and the difficulty of identifying the cryptic species within these groups or complexes. This is because not all the species within these groups are involved equally in the transmission of malaria. A study was carried out to determine the genetic diversity of *An. funestus* populations and their role in malaria transmission in three ecological areas in Ghana. Standard WHO procedures involving human landing and indoor resting catches were employed to collect mosquitoes. A total of 5496 *An. funestus* mosquitoes were collected from the study areas between April 2001 and December 2002. Sahel savanna area yielded 80.0% (4397), followed by 10.8% (594) and 9.2% (505) for the coastal and forest areas respectively. A total of 144 man-nights captured 1257 *An. funestus* mosquitoes with the sahel savannah producing more than 74.7% of all the collections. PCR identified *An. funestus s.s.* and *An. lessoni* as the genetic variants in all the three ecological areas. All the sporozoite positive samples were *An. funestus s.s.* None of the *An. lessoni* was found infective. *An. funestus s.s.* in all the ecological areas was highly anthropophilic with human blood index (HBI) in the range 80-96%. 83-95% of *An. lessoni* from all the ecological areas had fed on cattle. Malaria transmission was highest in the sahel savanna than the rest of the ecological zones with *An. funestus s.s.* being implicated as the vector in all the ecological zones. *An. lessoni* occurred in all three ecological areas, but played no role in malaria transmission, although a proportion of them were caught biting human. The study established for the first time the existence of *An. lessoni* and *An. funestus s.s.* in Ghana and emphasizes the important role of *An. funestus s.s.* in malaria transmission in all the three ecological areas.

