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STUDIES ON THE RESTING BEHAVIOUR, PAROUS AND
SPOROZOITE RATES OF ANOPHELINE MOSQUITOES IN THE
MWEA-TEBERE IRRIGATION SCHEME

BY

JASPER NATHAN IJUMBA

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ABSTRACT

Five anopheline species, Anopheles arabiensis, An. pharoensis, An. funestus, An. rufipes and An. coustani were identified in the study area. Anopheles arabiensis was the most abundant species in all collections made by different techniques. A comparison between chromosome preparations (n=54) and standard chromosome maps showed An. arabiensis to be the only sibling species of the An. gambiae complex in Mwea-Tebere. Behavioural studies on the resting habits of this species showed that adults were migrating randomly between indoor and outdoor-resting sites ($\chi^2=0.14$, $P>0.05$) during the short rains but formed distinct subpopulations (exophilic and endophilic) during the long rains ($\chi^2=13.10$, $P<0.05$). Behavioural patterns were not correlated with specific inversion karyotypes, but the results indicate a need for such studies. There is also a possibility that some females were resting outdoors in avoidance of a higher humidity deficit prevailing indoors. The studies reported here on the possible existence of the subpopulations of An. arabiensis were the first to be undertaken in Kenya.

It was estimated that 32% of the entire population was exophilic, and 41% were endophilic while 27% were migrating randomly between indoor and outdoor resting sites. The population of An. arabiensis was estimated to be 1.16×10^6

adults during the short rains and 2.91×10^5 adults during the long rains. Anopheline species of Mwea-Tebere were found to prefer bovids and other hosts to human. Even females that had fed on bovids outdoors were entering human dwellings to rest.

The estimated vectorial capacities of the different species were low especially during the short rains and dry season. This was attributed to the effect of low survival rates and low human blood index. Sporozoite rates (Plasmodium falciparum) as indicated by ELISA test results were low. Only An. arabiensis was positive for P. falciparum during the short rains. Three species, An. arabiensis, An. funestus and An. pharoensis were positive for P. falciparum during the long rains; however, none had a sporozoite rate of $\geq 2\%$. Although one An. pharoensis was positive by ELISA, there is no conclusive evidence to incriminate this species as a malaria vector in the area. Despite the low sporozoite rates, the estimated entomological inoculation rates were relatively high. Individuals were receiving at least 6 infective bites/man/month during short rains and 8 bites/man/month during the long rains. From the low life expectations of the anopheline species, infections of P. malariae (p^{23}) and P. ovale (p^{16}) would be unlikely to occur in Mwea-Tebere.

Though only 32% of the total population of An. arabiensis were exophilic, control of malaria in Mwea-Tebere by intradomiciliary residual spraying alone is not recommended

unless supplemented by larvicidal and malaria prophylactic measures. This is because some of the endophilic individuals are likely to have the potential to become exophilic through selection pressure. Also, if An. pharoensis (an exophilic species) turns out to be a significant vector of malaria in the area, it would hamper efforts to interrupt malaria transmission.