EFFICIENCY OF DIFFERENT ANOPHELINE SPECIES TO TRANSMIT HUMAN MALARIA IN SRI LANKA

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In this study, the vectorial efficiencies (eik) of the different anopheline species (i), which are vectors of human malaria in an endemic region were estimated, relative to that of the well characterised vector A. culicifacies (K), by deriving a mathematical expression.

The expression derived was based on the variation of sporozoite rates, man biting rates and human malaria incidence during a transmission season and is given by,

$$eik = \frac{SPRi}{SPRk} \times \frac{Ri}{Rk} \times \frac{Hk}{Hi} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (A)$$

where, SPR is the average sporozoite rate during a period, R is a function dependent on the MBR times the SPR variation and H is a function dependent on the man biting habit times infectivity times MBR, all of which are measurable parameters. However, the sporozoite rate variation would be difficult to measure for all species. As such, we used the following approximation to represent the sporozoite rate variation.

$$Var\,(SPR) = Var\left(MBR(t-T)i/MBR(t)i \; * \; a(t) \; * \; X(t-T)\right)$$

where T is the incubating period of the parasite in the mosquito vector, t is the time, a is the man biting habit and X is the average infectivity of the human population.

Using expression (A) we estimated the vectorial efficiencies of different anopheline species prevent in Kataragama. The multiple of the relative vectorial efficiency and the man biting rate (MBR) gives an equivalent MBR with respect to the K^{th} species. We were thus able to use the characteristics of one vector, A.culicifacies which are known or can be measured, with the relative MBRs of the other species in our studies to quantify transmission.

This investigation was supported by the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.