

MODELING THE EFFECT OF PERIODIC TEMPERATURE ON MALARIA
TRANSMISSION DYNAMICS

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Abstract

Malaria transmission depends on the survival, life-history parameters and population dynamics of adult Anopheles mosquitoes. These parameters and dynamics are sensitive to a number of factors key among them being the temperature. Temperature variation plays an important role in influencing the dynamics as it causes fluctuation of biting rate, mosquito death rate and the rate of progression from exposed to the infectious class. A model incorporating periodic temperature fluctuations is developed and existence of equilibrium states proved. The mosquito population abundance peaks with increasing temperature and disease endemicity depends on the degree of variation of temperature. Our results points to the importance of implementing intervention strategies, aimed at reducing malaria risk and eventually eliminating the disease, during the low temperature seasons.

Keywords: Endemic malaria, transmission, temperature, basic reproduction number, disease-free equilibria

R. M. NDUNG’U, G. P. POKHARIYAL, and R. O. SIMWA. 2016. “MODELING THE EFFECT OF PERIODIC TEMPERATURE ON MALARIA TRANSMISSION DYNAMICS”. Asian Journal of Mathematics and Computer Research 13 (2):91–105.
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